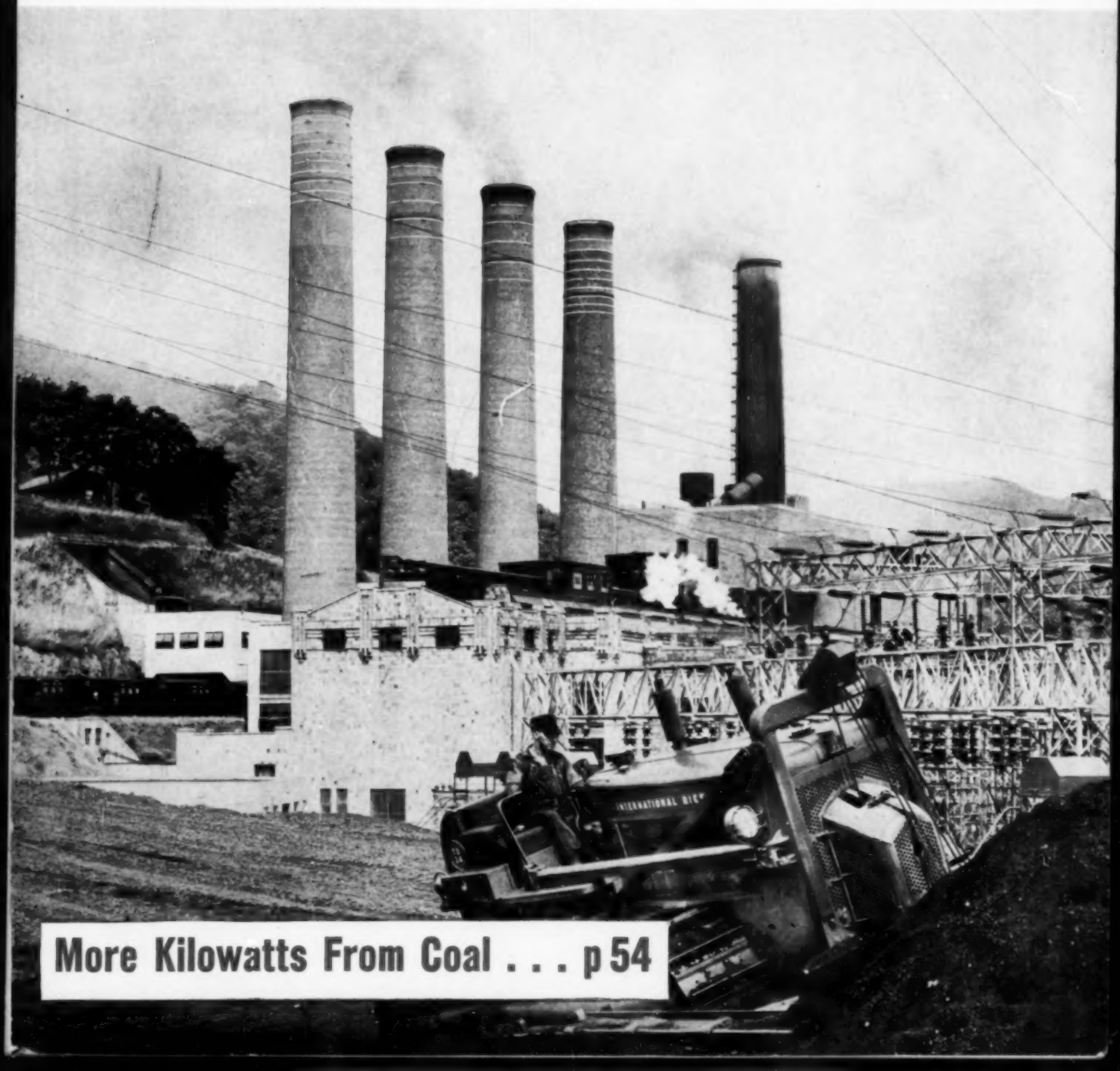
# Coal Age

JANUARY, 1955

A McGRAW-HILL PUBLICATION — PRICE 50c

## Progress Reports . . .

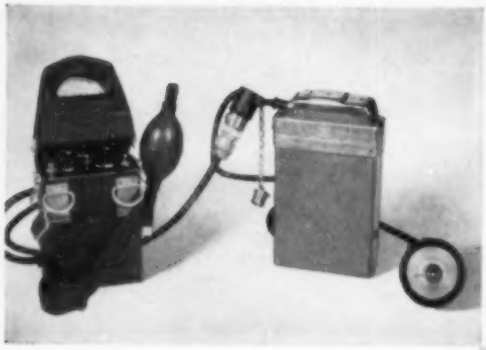




**More Kilowatts From Coal . . . p 54**

# *These M·S·A instruments keep you on guard against*

# METHANE



**M.S.A. METHANE DETECTOR TYPE W-8**

Portable, accurate instrument for measuring methane content of mine air at working face, break-throughs, air courses, and other points in mine where methane may accumulate. Operator simply squeezes rubber hand-bulb a few times, draws in air sample, and amount of methane is indicated on easy-to-read dial in less than 30 seconds. Two scale ranges—for greater reading accuracy—0 to 2% and 0 to 5%. U. S. Bureau of Mines Approved. Write for bulletin.

**M.S.A. METHANE TESTER TYPE E-2**

Streamlined, pocket sized unit, indicates methane concentrations as low as .2% in mine air. Pump is operated with the fingers while tester is held in palm of the hand. Edison Electric Cap Lamp battery provides dependable power. Unit connects and disconnects quickly from battery. U. S. Bureau of Mines Approved. Write for bulletin.

## *and for Continuous checks on Methane Concentrations*

### AT THE WORKING FACE

**M.S.A. METHANE ALARM**

This unit provides continuous sampling and automatic warning of hazardous methane concentrations during entire working shift. Sampled air that exceeds pre-determined safe limit sets off unit, and a flashing red light alerts miners. Portable, or available with shock mounting assembly for use on machinery. Edison R-4 Battery supplies power. Write for complete details.

### IN RETURN AIR SYSTEMS

**M.S.A. METHANE RECORDER**

Continuously charts methane concentrations in return air. This unit provides an accurate safety check against unusual gas conditions, and serves as a guide for regulating volume of air needed *to maintain proper and economical ventilation standards.* In addition to recording methane, this unit can be designed to give visual and audible warnings of increasing or dangerous conditions. Write for details.

MSA

SAFETY EQUIPMENT HEADQUARTERS

*When you have a safety problem, M.S.A. is at your service. Our job is to help you.*

**MINE SAFETY APPLIANCES COMPANY**

201 North Braddock Avenue, Pittsburgh 8, Pa.

At Your Service: 76 Branch Offices in the United States

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RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

Main slope belt of U. S. Steel's Robena Mine.

# B. F. Goodrich cord belt moves 25 million tons in 8 years

EVERY hour that conveyor belt can take 2800 tons of run-of-mine coal from car dump to screen house. It must climb an 18 degree incline, and travel 600 feet a minute. A B. F. Goodrich *cord* belt was selected for this job because engineers knew no ordinary belt could handle the high lift, long centers, heavy loads.

Unlike the usual conveyor belt, made of rubber and layers of fabric, the B. F. Goodrich belt is made with separate cords, each surrounded by rubber, running the length of the belt. The cords make the belt stronger without making it stiff, so it can run up steep angles and still keep its U-shape to prevent spilling.

Installed in 1946, the cord belt shown here has hauled more than 25 million tons, and is expected to last years longer. Another cord belt used by this coal company is still at work after 12 years and 29 million tons. And still another carried a record-breaking 43 million tons.

Natural troughing is just one of the reasons B. F. Goodrich cord belts last longer, and so cut coal-handling costs. Other construction features provide high impact resistance and double protection against mildew.

B. F. Goodrich has a complete line of conveyor belts for the coal industry. So no matter what type or size of coal you have to move, there's a B. F. Goodrich Caricoal belt that can do it better, for less. Let your BFG distributor give you full details, or write *The B. F. Goodrich Company, Dept. M-357, Akron 18, O.*

**B.F.Goodrich**
**INDUSTRIAL PRODUCTS DIVISION**

# THEY GET THERE


U. S. NAVY
XFV-1's
STREAK
STRAIGHT

# UP!

**"Get there fustest with the most-est" might be the motto of these new Convair "pogo-stick" planes. They literally leap vertically into the sky from the deck of a carrier before turning to go after the enemy. They're the latest addition to our formidable aerial armory; specially designed and built for this maneuver.**

## HULBURT OIL & GREASE COMPANY

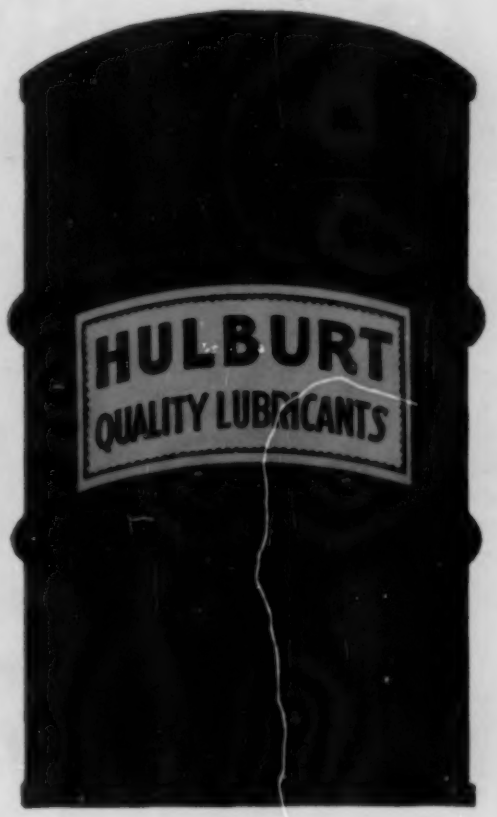
**PHILADELPHIA, PA.**

***Specialists in Coal Mine Lubrication***

# "FUSTEST"...FASTEST!

## LIKE HULBURT GOES AFTER FRICTION

KEEP UP KEEP DOWN —WITH




# Hulburt

# QUALITY LUBRICANTS

**Hulburt Quality Lubricants get into fighter action, go after friction instantly, when you apply them to your mining machines. That's because they're specially compounded for the tough needs of coal mine service . . . they serve best when you let a Hulburt Lubrication Engineer "pilot" their correct application in your mine. Contact!**

# The 1955 Way To Dewater Fine Coal

Why do it the hard way when the most modern way is also the simplest and most direct?

The Bird Coal Filter turns out a ton of dried ¾" x 0 coal a minute — no more than 7% surface moisture even when the coal contains as much as 10% minus 200 mesh. Moisture bearing, high ash slimes no longer go out with the coal.

The BIRD requires no auxiliary equipment. It runs for months without maintenance shutdowns. Cost of operation and maintenance is less than seven cents a ton.



# The 1955 Way To Polish Up The Coal Cleaning Water

Why not get rid of the sludge pond nuisance and the pollution problem once and for all?

The Bird Polisher operates with a simple, low cost flocculation system to take out all the solids, even fine slimes — delivering them to a refuse belt. Only clear water goes back to the washer for reuse.

***Why not get the whole story on the Bird Coal Filter and Bird Polisher?***

**BIRD MACHINE COMPANY**

SOUTH WALPOLE • MASSACHUSETTS

# Coal Age

# JANUARY • 1955



### What's Ahead in '55

**An annual feature for many years,** *Coal Age's* Review and Forecast section leading off the February issue will give you the first available overall analysis of the coal industry's progress and development in 1954—plus an authoritative look at its 1955 prospects. Emphasizing the new and significant factors, this comprehensive study will combine staff research and reports, the latest statistics compiled by USBM experts and the views of many of the industry's leaders obtained specially for publication in this issue in such fields as:

**Tonnage records and forecast.**

**New and important developments in mining and preparation.**

**Competitive fuels and markets.**

**Labor and public relations.**

**Trends in machinery purchases.**

**Safety progress and prospects.**

### Take a look at . . .

**The variety of equipment and mining methods** and the several significant new developments described and illustrated throughout this issue if you're seeking new or different ideas for more effective, lower cost operation. There's quite a spread in this month's "Operating Reports"—full details on two deep mines getting high output per man, a high-capacity anthracite stripping, underground augering to control bumps, and a newly developed drill that cuts a 75-in hole.

Next month, of course, in addition to the Review and Progress section, *Coal Age* will offer a full complement of mine reports in deep mining, stripping and preparation. A new 3,000-tpd underground mine in Western Kentucky, a strip property recently opened by a major company in Indiana, and a new method of face ventilation in continuous-miner operation are three now scheduled.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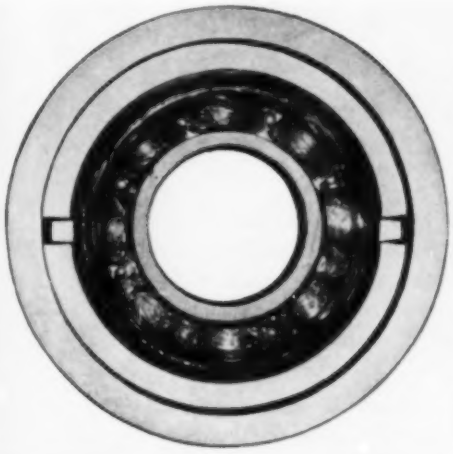
## ...Here's why

• Stop-motion photography shows bearing revolving at 3,750 r. p. m. with temperature of the *Texaco Regal Starfak* above 250°F. But note how this premium-quality lubricant completely fills the retainer and guards the moving parts. This is the *full protection* your bearings will get when you use *Texaco Regal Starfak.*





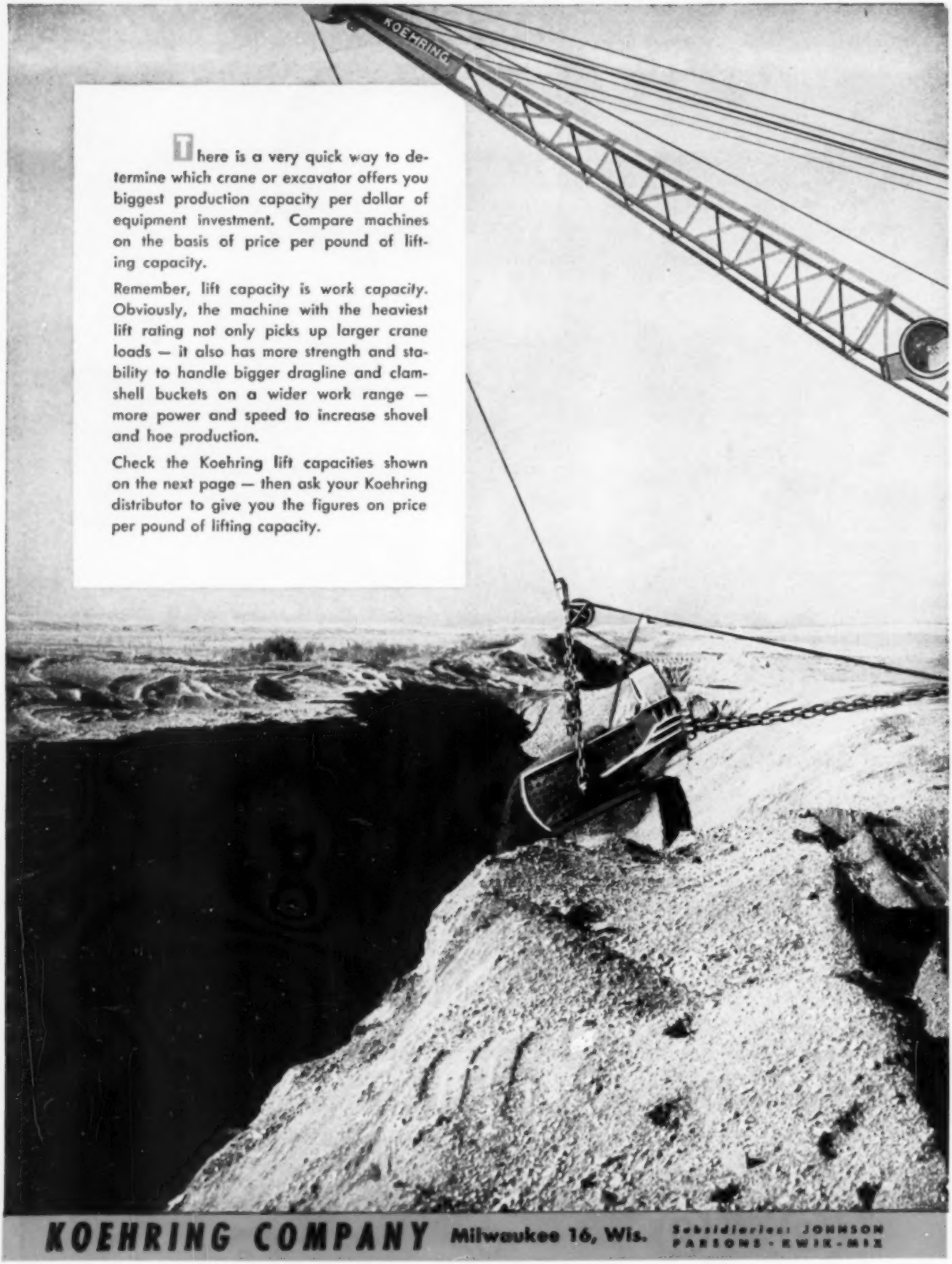
**GREASE-LUBRICATED** ball and roller bearings in locomotives, cutters, loaders, motors and other equipment give better performance, last longer and cost a lot less to maintain when the lubricant is premium-quality *Texaco Regal Starfak*. The photo above shows why.

*Texaco Regal Starfak* stays *in* the bearings, gives each ball or roller continuous, full protection. *Texaco Regal Starfak* has exceptional resistance to oxidation, gum formation, separation and leakage. Seasonal temperature changes do not affect it. Bearings run cool and without "drag." In addition, *Texaco Regal Starfak* lasts longer than ordinary greases and so fewer applications are necessary.

On wire rope and open gears, use *Texaco Crater* or (for greater application convenience) *Texaco Crater X Fluid*. These famous products keep rope strong longer, assure smoother gear performance, longer gear life.

Let a Texaco Lubrication Engineer help you keep efficiency high and maintenance costs low throughout your mine. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

# LUBRICANTS for the Coal Mining Industry

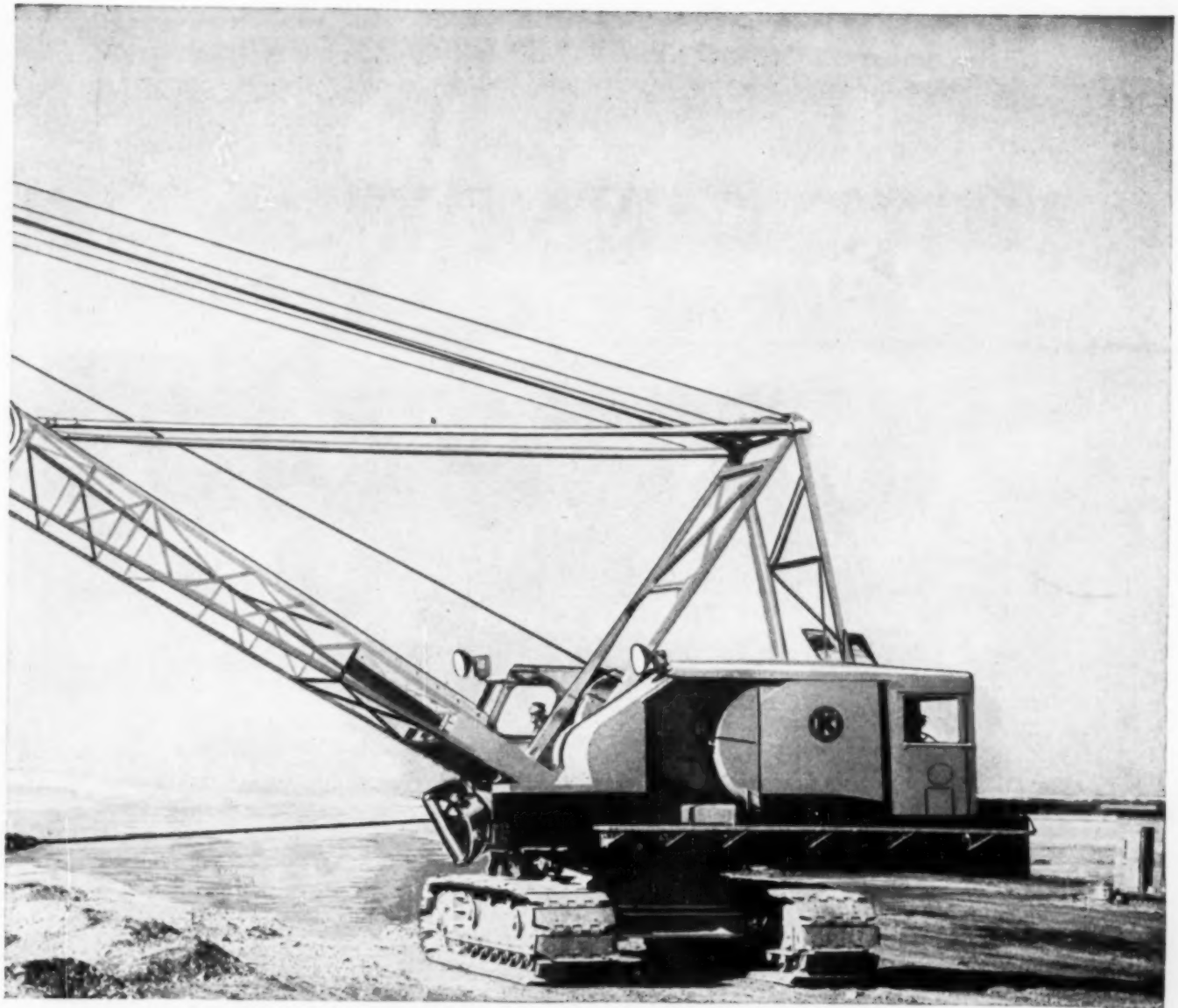



There is a very quick way to determine which crane or excavator offers you biggest production capacity per dollar of equipment investment. Compare machines on the basis of price per pound of lifting capacity.

Remember, lift capacity is work capacity. Obviously, the machine with the heaviest lift rating not only picks up larger crane loads — it also has more strength and stability to handle bigger dragline and clamshell buckets on a wider work range — more power and speed to increase shovel and hoe production.

Check the Koehring lift capacities shown on the next page — then ask your Koehring distributor to give you the figures on price per pound of lifting capacity.

**KOEHRING COMPANY** Milwaukee 16, Wis. Subsidiaries: JOHNSON PARSONS · KWIK-MIX



**Check** price per pound of lifting capacity

| KOEHRING MODEL | SIZE DIPPER | KOEHRING LIFT CAPACITIES (Crawler ratings based on 75% of tipping load. Rubber-tired machines — 85% of tipping load) | | PRICE PER POUND OF LIFT CAPACITY* |
|---|---|---|---|---|
| 205 CRAWLER | ½-Yd. | 20,000 lbs. | 30-foot boom at 10-ft. radius | ? |
| 205 ON RUBBER | ½-Yd. | 30,000 lbs. | 25-foot boom at 12-ft. radius | ? |
| 304 CRAWLER | ¾-Yd. | 27,800 lbs. | 35-foot boom at 12-ft. radius | ? |
| 304 ON RUBBER | ¾-Yd. | 50,000 lbs. | 30-foot boom at 10-ft. radius | ? |
| 405 CRAWLER | 1-Yd. | 40,000 lbs. | 40-foot boom at 12-ft. radius | ? |
| 605 CRAWLER | 1½-Yds. | 72,300 lbs. | 50-foot boom at 12-ft. radius | ? |
| 1005 CRAWLER | 2½-Yds. | 159,000 lbs. | 50-foot boom at 12-ft. radius | ? |

*Figures available on request—ask your Koehring distributor for them.

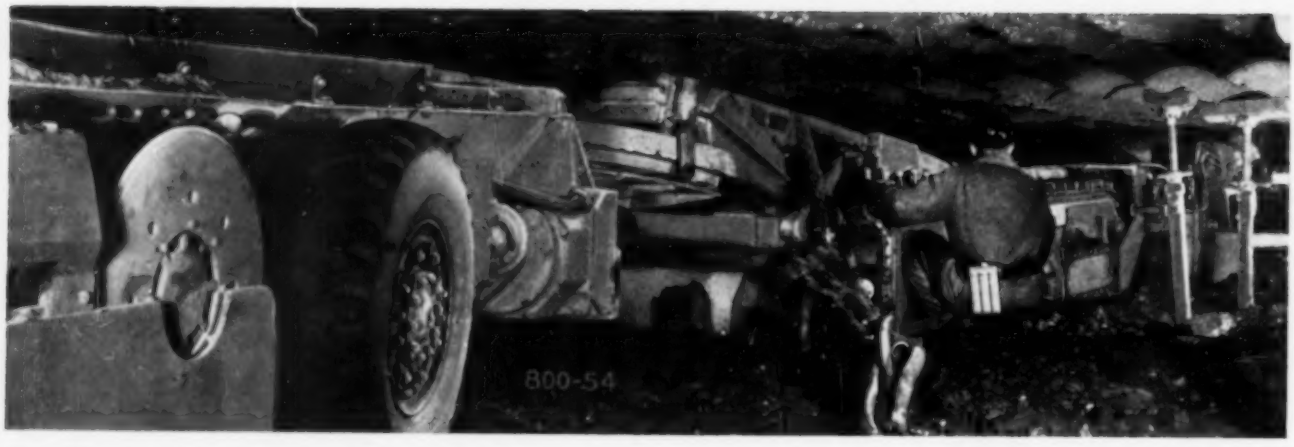
KOEHRING HEAVY DUTY

# a mighty 'mole' for low-vein coal...

# JEFFREY 76-AM COLMOL

PATENTED


76-AM COLMOL mining by "offset cut" method in West Virginia coal seam. Second lift is in progress. Model shown has a mining range of 40" to 52".




The rugged 25-ton 76-AM COLMOL keeps digging and advancing continuously . . . so flexible it can turn in its own length . . . operates with little noise or vibration.

The outstanding ease of operation is apparent in the view immediately above which shows the COLMOL loading into a shuttle car. Once set, the controls need little attention . . . greatly reduce operator fatigue. The operator is in a protected location 20 feet from the face. Duplicate controls permit choice of more accessible side for operating.

Overlapping breaker arms (see large photo) rotate at less than 60 RPM—a relatively slow speed which minimizes fines and dust. Arms sweep inward enabling conveyor to pick up loose coal. Upper row of breaker arms can be raised hydraulically as much as 12" to allow for varying seam thicknesses. Entire head can be raised, lowered or tilted to follow rolls.



## Pace-Setting HD-5G Tractor Shovel

The powerful 76-AM COLMOL mines up to 80 tons per man-shift in coal seams as low as 38". Its tonnage record in prominent coal mines challenges comparison with any other continuous-type mining machine!

The 76-AM COLMOL advances continuously into a solid seam, removing all coal from an area 9'8" wide by 38" high and upward. It eliminates the need for three separate operations of cutting, drilling and loading, by simultaneously mining and loading coal without the use of explosives.

Here are just four of the COLMOL'S advantages: * One compact machine does the work of several "conventional" machines. * High productive capacity per man lowers mining cost per ton. * Screen analyses show that in many cases the COLMOL mines coal comparable in size composition to that produced by "conventional" mining. * Long wide crawlers with cleats enable it to operate over almost any bottom condition.

*Learn more! Write for new COLMOL Bulletin 877.*


**THE JEFFREY MANUFACTURING CO.**

ESTABLISHED 1877

Columbus 16, Ohio

*sales offices and distributors in principal cities*

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

**IF IT'S MINED, PROCESSED OR MOVED . . .IT'S A JOB FOR JEFFREY!**

# Pace-Setting HD-5G Tractor Shovel

# NOW BETTER 3 WAYS


From the time of its introduction seven years ago, the Allis-Chalmers HD-5G Tractor Shovel has been tops in popularity. Many thousands are daily proving their ability and versatility on all kinds of material handling and excavating jobs.

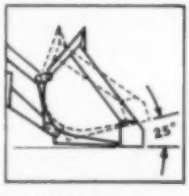
Now, design refinements make the HD-5G a three-way better value than ever before:

## 1. Has Bigger Rated Capacity

New bucket handles a big 1¼-yd load — streamlined design now helps roll in large loads with less tractor effort. The back of the bucket has been brought forward and the sides extended to cut spillage, put more payload where it's wanted.

## 2. Helps the Operator Do More

Cleaner dumping with the new bucket saves the operator time and effort shaking out loads.

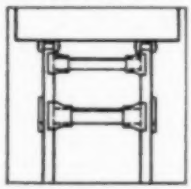



For added versatility, there is a two-position bucket available with both standard automatic return to digging position and operator-controlled tip-back. If the operator chooses to use the controlled tip-back, he can load the bucket, then tip it back approximately 25° before raising, assuring maximum output under special conditions such as downhill loading or loading loose materials.

The HD-5G helps the operator do more in other ways, too — giving him full vision, fast and easy control, cleaner platform and more comfortable seat from which to work, and more working time with truck wheels, support rollers and idlers that need greasing only once every 1,000 hours.

## 3. Works at Lower Cost

The HD-5G now works at even lower cost than ever before — not just because it *does more*, but because it has features that mean *less maintenance, longer life.* For instance, new type tubular bracing on the bucket booms provides added strength and support, keeps the bucket in line. The floor at the rear of the new bucket has been raised seven degrees to reduce wear on the bottom sheet. Heavy-duty truck wheels and idlers are available for particularly tough working conditions. One-piece, full-length main frame permits unit construction so that major assemblies can be removed without disturbing adjacent units, putting tractor back on the job in hours rather than days.



***Ten Quick-Change Attachments Add to HD-5G Versatility***

| | | |
|---|---|---|
| Bulldozer | Crane Hook | Tine Fork |
| Angledozer | Light Material Bucket | Rock Fork |
| Narrow Bucket | Trench Hoe | — also rear-mounted Ripper |
| Rock Bucket | Lift Fork | |

*See your Allis-Chalmers dealer for more about these and other production-boosting features of the popular HD-5G Tractor Shovel.*

**ALLIS-CHALMERS**
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

# A PAIR FOR PROFIT IN LOW COAL!

## Goodman TYPE 870 SHUTTLE CAR

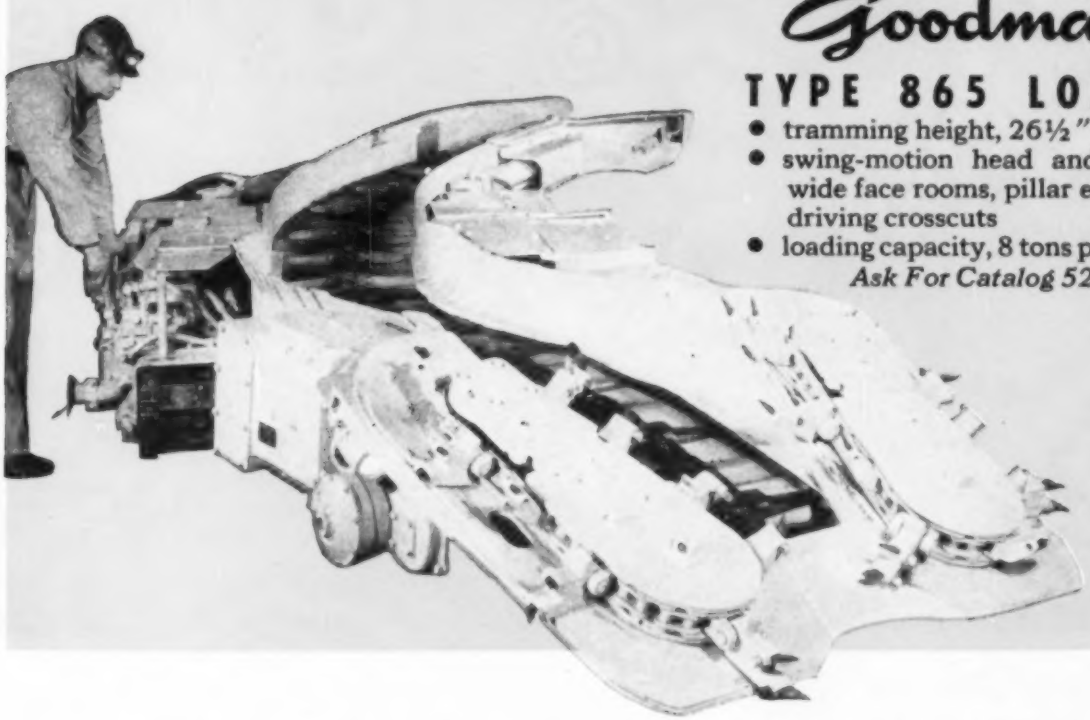
- basic height, 26"
- capacity, water level, full, 94 cu. ft.
- 4-wheel power steering, 4-wheel disc type brakes, 4-wheel drive, adjustable height discharge, hydraulic cable reel

*Ask For Catalog 5411*

## Goodman TYPE 865 LOADER

- tramming height, 26½"
- swing-motion head and tail for wide face rooms, pillar extraction, driving crosscuts
- loading capacity, 8 tons per minute

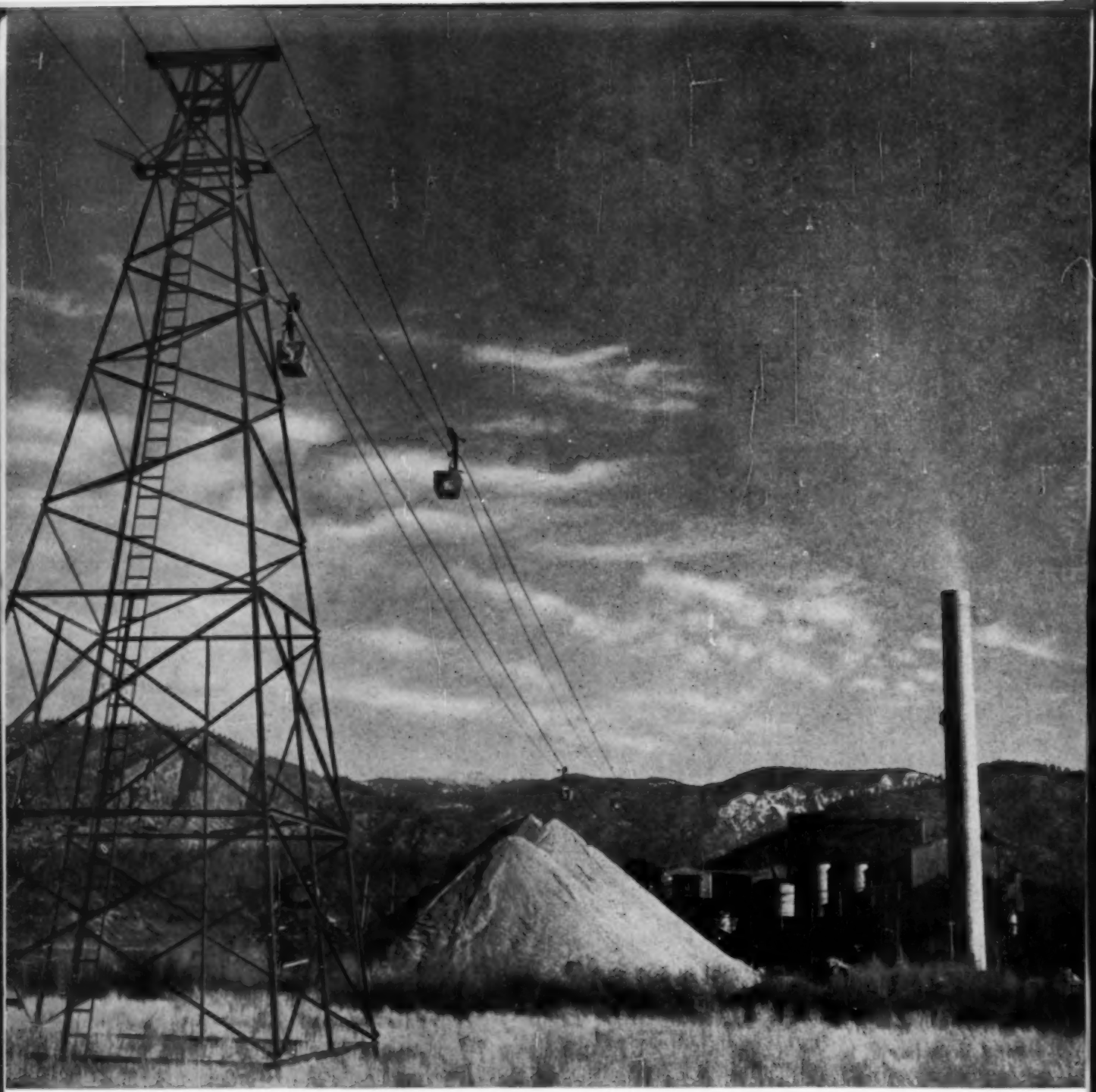
*Ask For Catalog 524*



Goodman builds a complete line of loaders and shuttle cars for trackless mining. See this equipment in action for proof of ability to produce high tonnages. A Goodman sales engineer will be glad to arrange a mine visit.

**Goodman**
MANUFACTURING COMPANY
HALSTED STREET at 48th · CHICAGO 9, ILLINOIS

**Cutting Machines • Conveyors • Loaders • Shuttle Cars • Locomotives • Continuous Miners**



**Wire Rope at Work**—Near Chewelah, Wash., is the 13½-mile aerial tramway serving the properties of Northwest Magnesite Co. Built in two sections by Riblet Tramway Co., the system hauls magnesite to the concentrating mill, thence to the big reduction plant. It is one of the finest aerial carriers ever constructed, and one of the longest to be found anywhere in this country.

The system depends in large measure upon sturdy wire rope, and approximately 140,000 ft of Bethlehem traction ropes haul buckets on both legs of the tramway. These ropes consist of 1-in. 6 x 19 on one section, ¾-in. 6 x 7 on the other—Purple Strand grade, of course, for maximum strength and toughness.

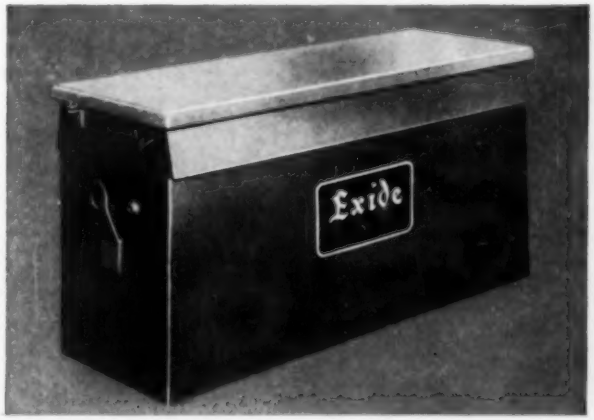
# GET LOWER PRODUCTION COSTS, FASTER HAULAGE

## ...with dependable Exide-Ironclad batteries!

An Exide-Ironclad battery powers this tractor in the new Freeman #4 mine of the Freeman Coal Mining Corporation near Marion, Illinois. Efficient, modern methods have boosted production.

**YOU CAN** count on Exide-Ironclads to help speed up car changes, keep loaders busy and main line haulage moving fast. This means you get more trips per shift, more production per man-hour with less cost per ton handled. Exide powered equipment will handle as much tonnage during the last hour of the shift as during the first. Lower costs for operation, maintenance and depreciation make Exide-Ironclad batteries your best power buy—AT ANY PRICE!

**THE POSITIVE PLATES** are the heart of any battery. Only Exide uses a slotted tube construction. By use of tubes, more active material is exposed to the electrolyte, providing *greater power*. Also, more active material is retained, giving *longer working life*.

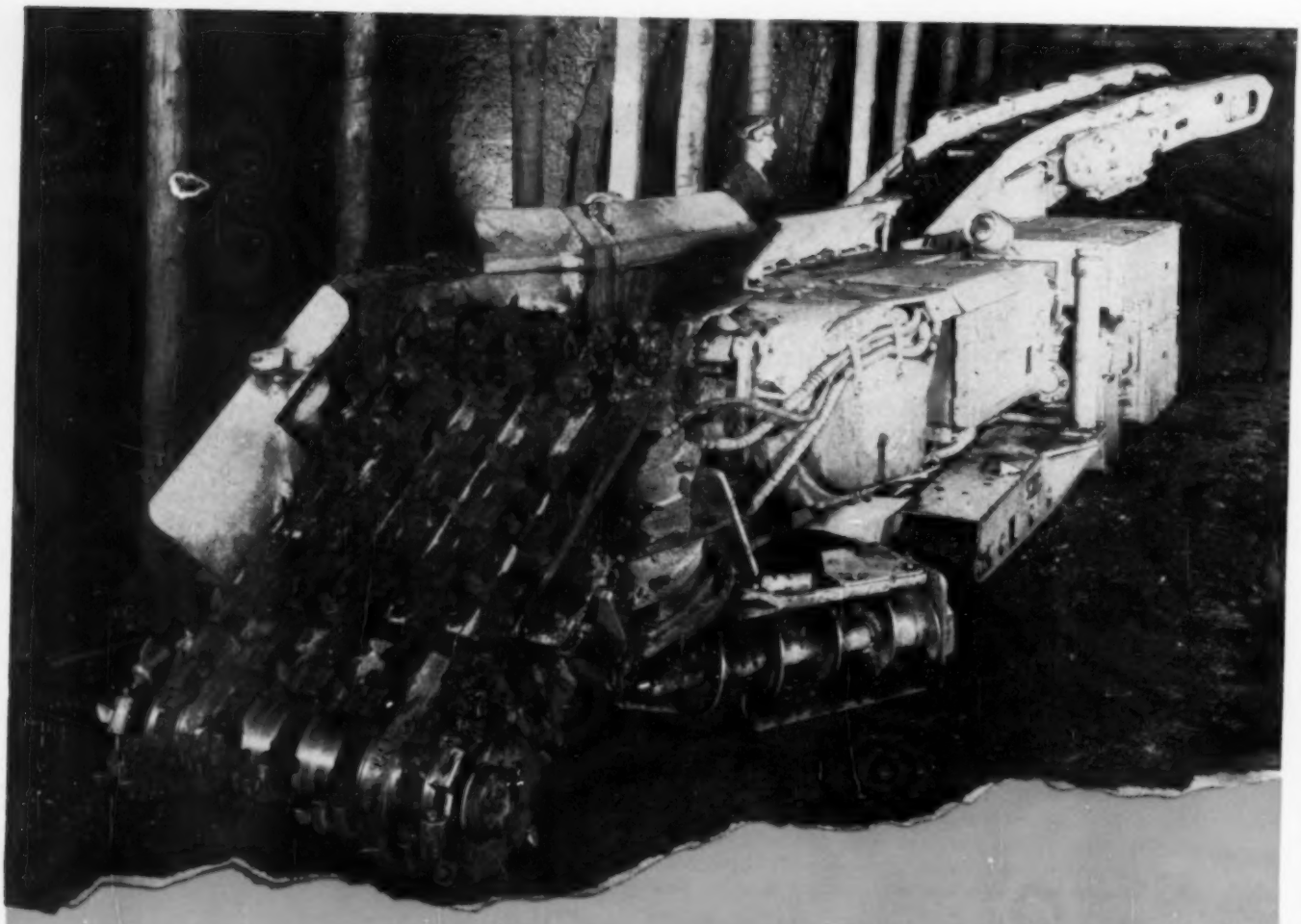



**THE NEW THRIFTY HAULER!** The improved shuttle car battery using *Non-oxidizing* plastic power tubes for longest battery life, more capacity in the same space. For full details, call your Exide sales engineer—write for Form 1982 (Installation and Maintenance of Motive Power).

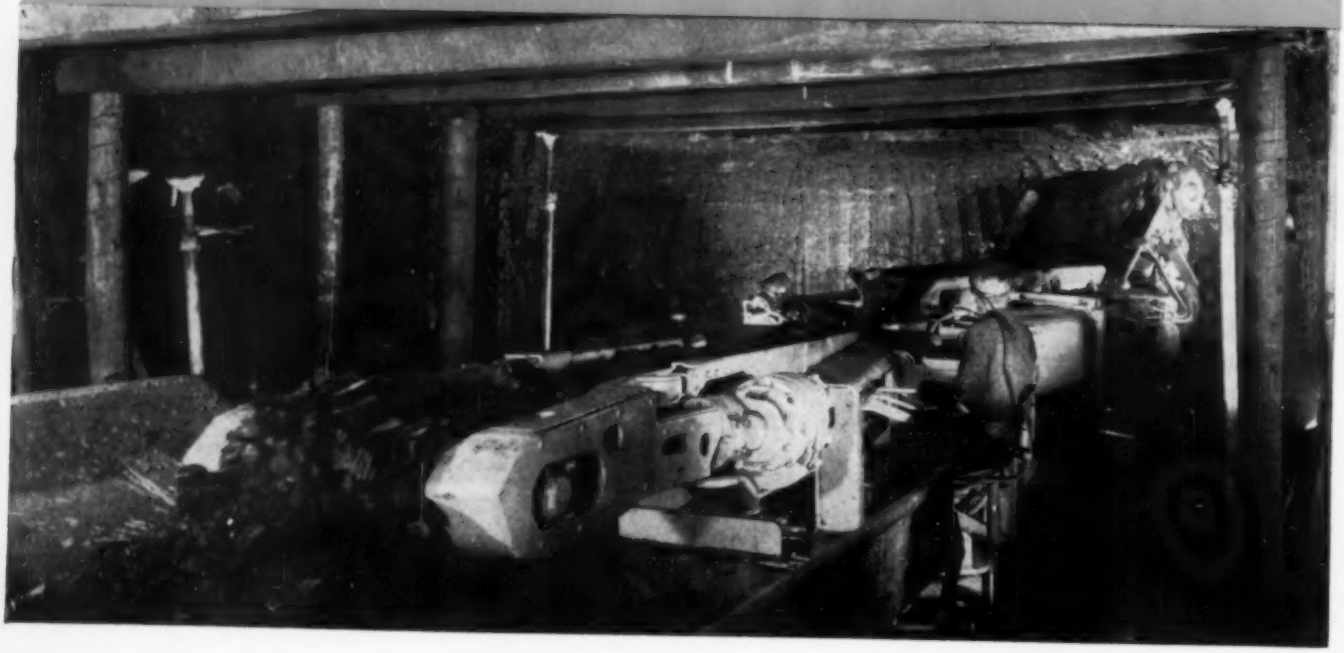
**Your best power buy**
***...AT ANY PRICE!***

**Exide®**
**IRONCLAD® BATTERIES**

**Exide INDUSTRIAL DIVISION,** The Electric Storage Battery Company, Philadelphia 2, Pa.



# This is the JOY 1-CM Continuous Miner



# Here's what the 1-CM did during a recent month's run

| | |
|---|---|
| TOTAL PRODUCTION FOR THE MONTH (RAW COAL) | 17,818 TONS |
| TOTAL SHIFTS WORKED (TWO ON-ONE OFF) | 39 |
| AVERAGE PRODUCTION PER SHIFT | 457 TONS |
| BEST PRODUCTION SHIFT | 650 TONS |
| WORKING CREW CHARGED TO THE UNIT | 8½ MEN PER SHIFT |
| AVERAGE PRODUCTION PER MAN PER SHIFT | 53.8 TONS |

The results above cover a regular month of operation in a West Virginia mine. The Joy 1-CM unit was teamed with two Joy 10-SC shuttle cars unloading on belt conveyors. The coal is in the Pittsburgh seam and averages about 8 feet in thickness. Mining height is limited to about 7 feet, some head coal being left for roof support, and some bottom coal because of high ash and sulphur content.

**DIFFICULT CONDITONS . . .**

The seam contains numerous clay veins varying from a few inches to 4 feet thick, resulting in both bad top and bottom when encountered. Frequency of these clay veins is indicated by the fact that 76 shuttle car loads of clay vein material were hauled during the period covered by this performance report. The seam also contains some pyrite in the form of lenses and laminations. The top was controlled by wood timbering as the Miner advanced, followed later by roof bolting on the off-shift.

**EXCELLENT RESULTS!**

You'll note that the Joy 1-CM showed an average production for the month of 457 tons of raw coal per shift, or 53.8 tons per man-shift. That actually represents an increase *of about* 40% over conventional mining methods. It is also an interesting fact that the size consist varied very little from conventional methods. *Those are results that speak for themselves!*

For heavy-duty operation and high-tonnage production in seams of 52" and higher, the Joy 1-CM-2 model (illustrated at left) will pay you handsome dividends in reduced cost per ton. For lower coal, there's the popular 3-JCM Continuous Miner, only 34" in over-all height. ● Let us help *you* to protect and increase your profit margin under today's conditions. ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario*

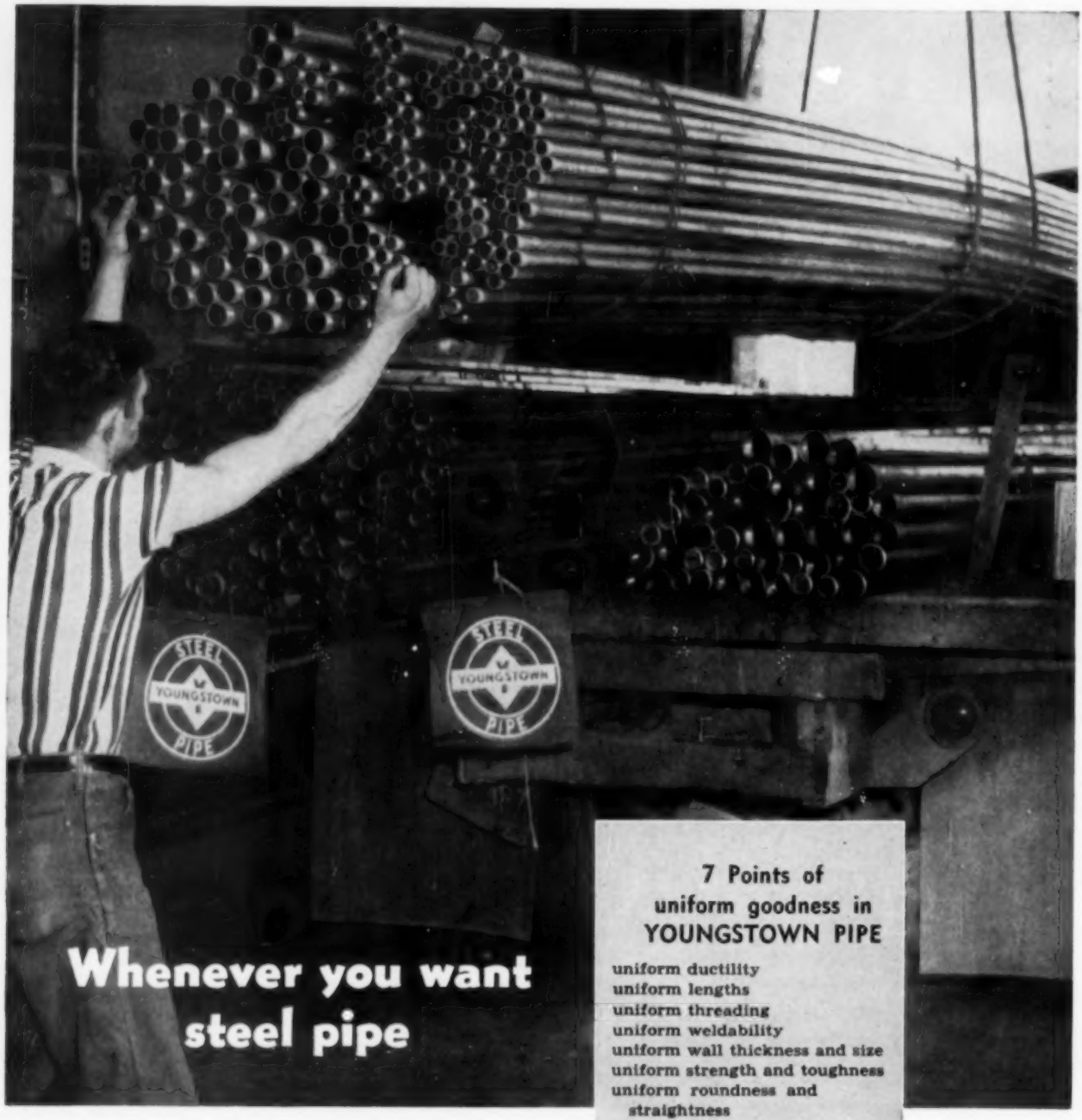
**Write for Bulletins, or**

*Consult a Joy Engineer*

W&D CL5492

**JOY**

**WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT**




# Whenever you want steel pipe

**7 Points of uniform goodness in YOUNGSTOWN PIPE**

- uniform ductility
- uniform lengths
- uniform threading
- uniform weldability
- uniform wall thickness and size
- uniform strength and toughness
- uniform roundness and straightness

● Made of finest quality steel, with close attention to size, threading and finish — that's Youngstown! You can't buy better pipe anywhere.

And your Youngstown Distributor is there to serve you. He has a big stock of this good pipe in all wanted sizes, close at hand and ready to deliver promptly. Why not phone him whenever you need pipe?

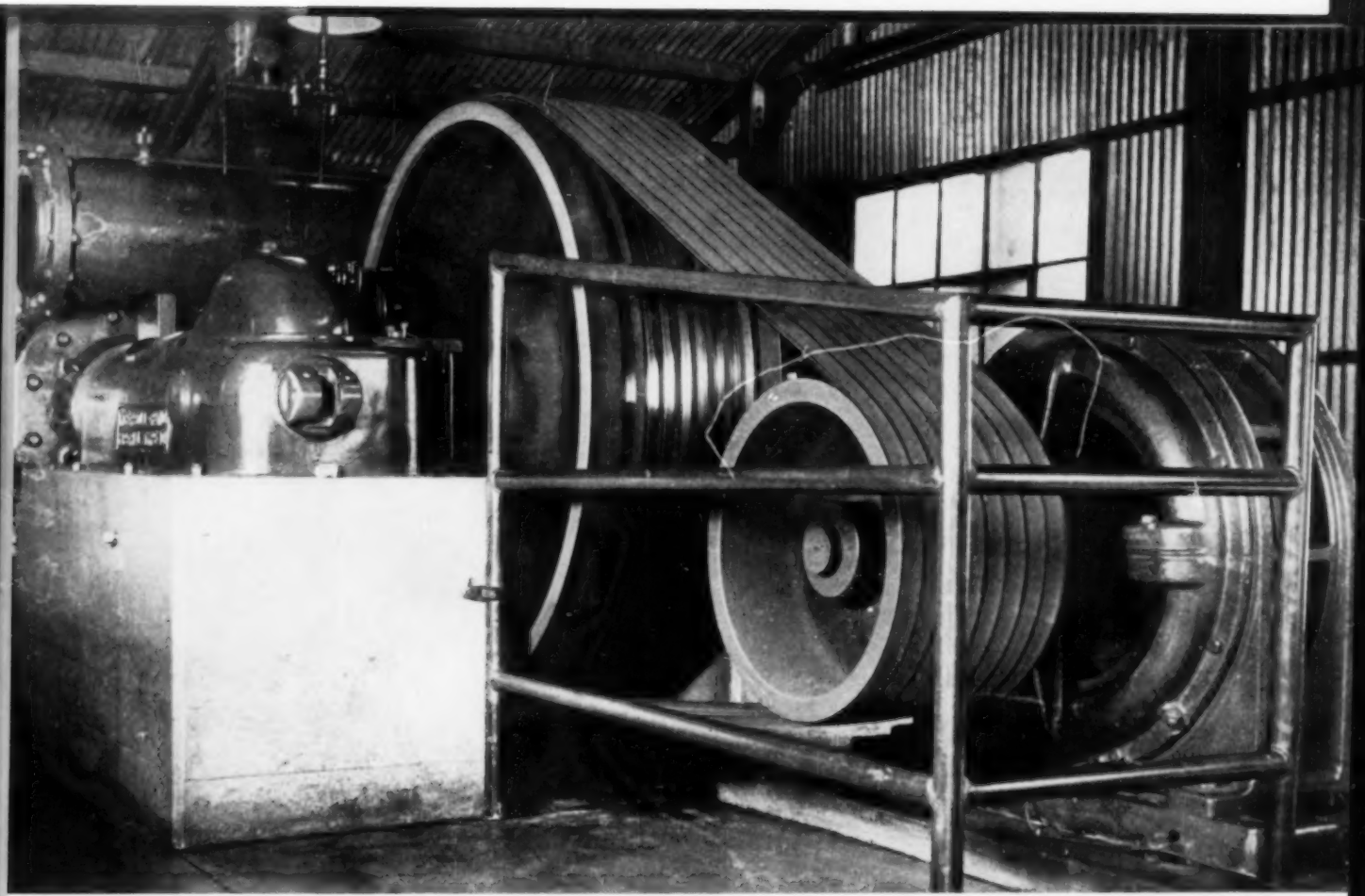
**Youngstown**

QUALITY YOUNGSTOWN SERVICE

**THE YOUNGSTOWN SHEET AND TUBE COMPANY** *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices: Youngstown, Ohio - District Sales Offices in Principal Cities

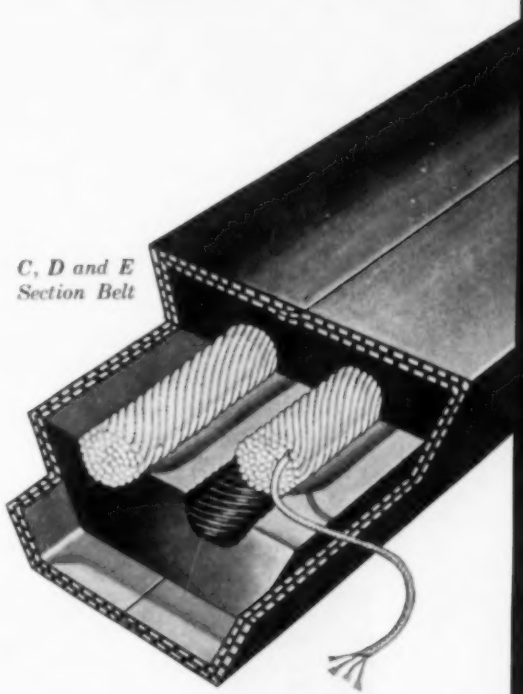
SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES



# Thermoid Multi-V Belts cut operating costs

There's a Thermoid V-Belt for every mining application. Every belt is *pre-stretched* to provide longer service and maximum power transmission without slippage. Thermoid C, D and E sections are rayon-grommeted for brute strength and extra flexibility that withstands repeated shock loads. The entire belt is vulcanized into a solid unit that resists moisture, abrasion, internal friction and heat.

Get longer wear with less maintenance . . . cut your operating costs with Thermoid Multi-V Belts. To meet the exacting requirements of mining service, your Thermoid Distributor carries a complete line of Thermoid Multi-V Belts, Hose and Conveyor Belting. Call him or write direct for complete information.



*C, D and E Section Belt*

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

**Thermoid**

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah


# "PACHYDERMATOUS" MINE CABLE

## *helps keep your mining continuous*

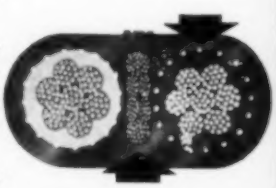
That's a five-dollar way of saying that Rome 60 Mining Cables have elephant-tough hides . . . that they're thick-skinned, able to take it.

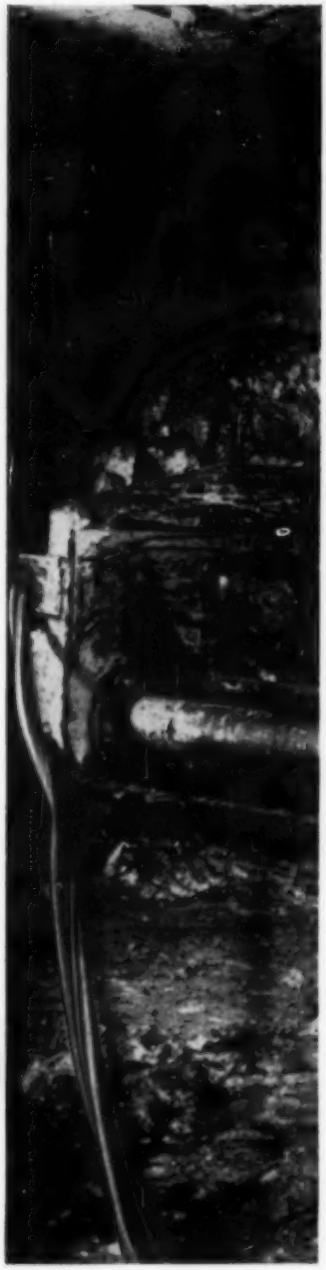
Of course, any mining cable will wear out eventually. But the right cable will minimize cable service problems, cut down time, keep your machinery producing.

As a good example of what a properly designed cable can mean to you, check these money-saving features of Rome 60 Parallel Duplex Cable.

1. **Flexible**—Tough Neoprene webbing separates the grounding conductor from the insulated conductors. This gives you high impact resistance, low conductor fatigue, better protection against "shorts," while maintaining maximum flexibility.
2. **Interlocked Construction**—This cross section shows what interlocked construction is . . . the open braid around each conductor locks the conductor to the Neoprene sheath. This interlocked construction prevents separation of conductors from sheath caused by twisting, pulling, flexing.
3. **Overload Protection**—The insulation is compounded for heat resistance to permit continuous operation at 75°C. (167°F.) and adequately protects against deterioration at the high overloads often experienced.
4. **Tough Outer Sheath**—Tire-like toughness is given by the molded-in-lead Neoprene sheath. It protects your cable against impact, acids, oils, abrasion and flame.
5. **Meets Codes**—The Neoprene sheath, marked P-105 BM, conforms to State of Pennsylvania and Bureau of Mines Safety Codes.

When you invest in Rome 60 you make your total investment in men and machinery pay off best.



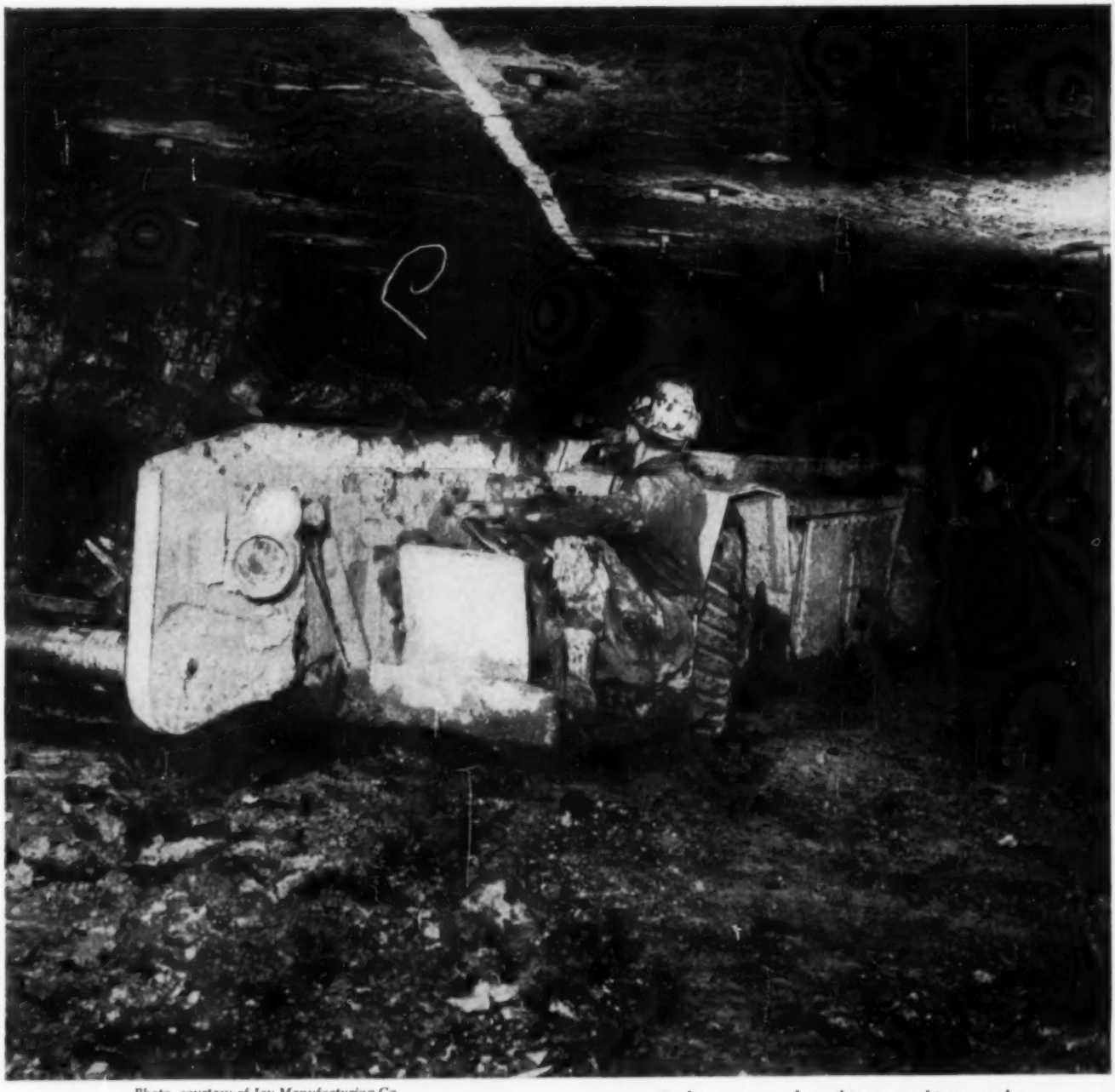


**Abrasion**—Tire-tough compact construction, molded in lead, protects Rome 60 Mining Cables against abrasion.

**Twisting**—The firm interlocking braid prevents loosening of conductors and sheath separation because of twisting and bending.

**Immersion**—Protection against moisture, corrosion and flame assured by the rugged sheath and specially compounded rubber insulation.

**Crushing**—The Neoprene web between insulated conductors and grounding conductor provides high impact resistance, protects against "shorts."



*Photo, courtesy of Joy Manufacturing Co.*

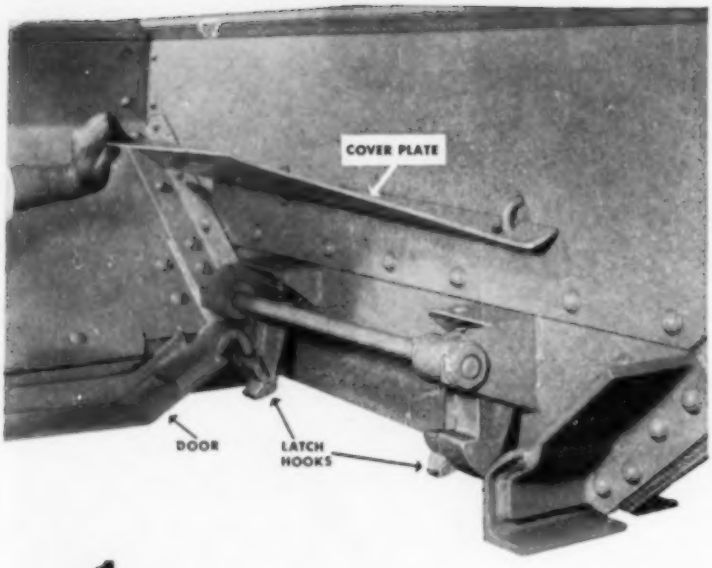
To keep men and machinery working, tough, dependable electrical cable is a must. Rome 60 Mining Cables can help you get more tonnage.

## *Quality mining cables and cords*

- **Multiple-conductor power cables—Types W and G**
- **Type SO portable cords**
- **Single-conductor locomotive cable**
- **Mine power distribution cables**
- **Shovel and dredge cables**
- **Shot firing cord**

*It Costs Less to Buy the Best*

ROME CABLE Corporation
ROME · NEW YORK
and
TORRANCE · CALIFORNIA




# Only S-D Automatics give you these advantages

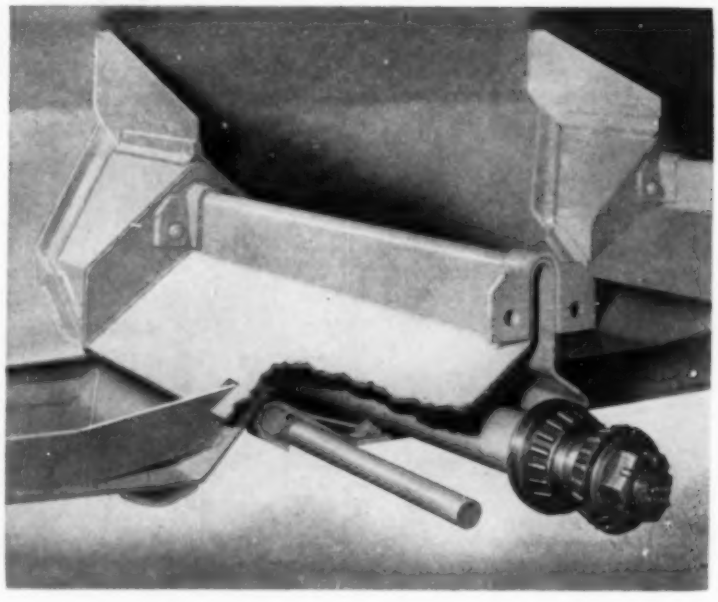
**1** TWO LATCHES FOR SAFE AND SURE LATCHING! They are tripped simultaneously underneath car for automatic dumping. With S-D "Twin Safety Latches" your bottom dumping car doors are actually padlocked twice. These latches (see photo above) are tripped independently by a pair of tripping devices mounted between the rails. (Note the tripping devices shown in bin photo on opposite page.) Both latches must be tripped simultaneously before the doors open. This eliminates doors opening accidentally anywhere along the haulage route.

**1** "Twin Safety Latches" for safe and sure latching

**2** Safety Sealed against dust leakage

**3** ¼ to ½ ton more capacity per car for the same overall dimensions

**2** SEALED AGAINST DUST LEAKAGE! Sanford-Day's exclusive bottom dumping car seal means two extra values: (1) Sealed S-D Automatics give you a new, safer in-the-mine operation by eliminating leakage of dust. (2) Sealed S-D Automatics enable you to make a tremendous reduction in track clean-up costs. Cross-sectional view at right points out how the flares extend over doors when closed, sealing material in car.





Another P&H "first"

**3** ONE-QUARTER TO ½ TON MORE CAPACITY PER CAR FOR THE SAME OVERALL DIMENSIONS is available only in S-D Automatics because of the construction features of Sanford-Day's exclusive bottom dumping car design. If you were buying, for example, 16 bottom dumping cars of any other make with a 4-ton level full capacity, you would need only 14 S-D Automatics of the same overall dimensions to haul the same tonnage. You would save two cars in every 16 . . . 12½ percent in original investment . . . 12½ percent in maintenance . . . 12½ percent less dead weight to haul. Any one of our sales engineers will demonstrate to your complete satisfaction just how we are able to give you this extra capacity.

THESE THREE fundamental and necessary advantages are offered only by S-D Automatics! They mean that only S-D Automatics can haul coal out of your mine at the lowest possible cost! Assure yourself of the maximum economies bottom dumping cars offer you by buying S-D Automatics! For complete information, write or call us today. Sanford-Day Iron Works, Inc., P. O. Box 1511 . . . Telephone 3-4191, Knoxville, Tenn.

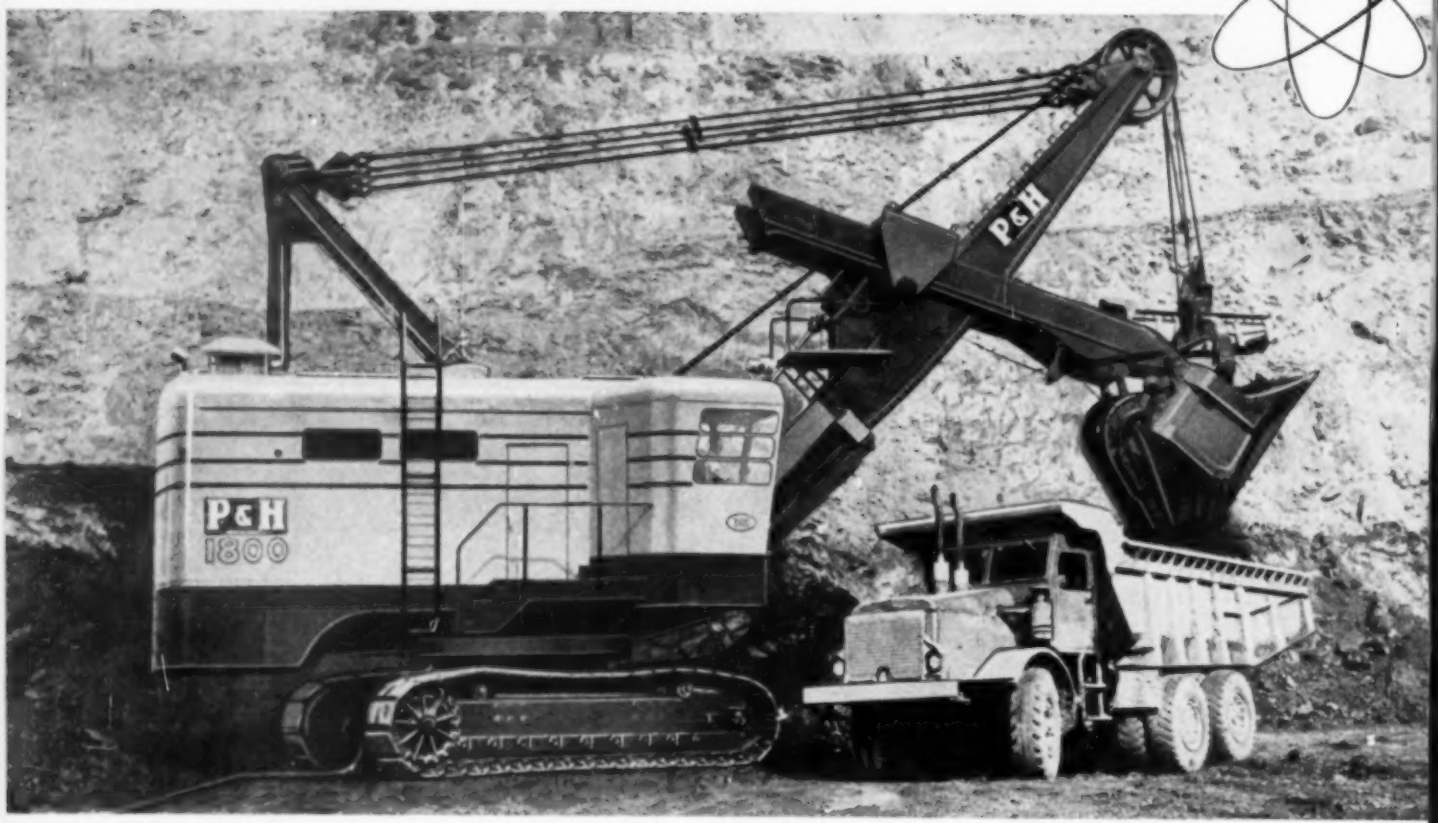
**Sanford-Day**
***IRON WORKS***
**KNOXVILLE • TENNESSEE**

AND
**BROWN-FAYRO**
DIVISION

MINE CARS, All Types - PRECISION WHEELS - "Brownie" HOISTS
CAR RETARDERS - SPOTTERS
PUMPS - OIL SPRAY SYSTEMS

# Another P&H "first"

# Electronic Control!




P&H Model 1800 (8 Cu. Yd. Capacity)

## a great forward step in Electric Shovel performance

**ELECTRONIC CONTROL** — using grid control thyraton tubes for the first time on any electric shovel. Applied to all operating motions! Results in finer performance characteristics . . . more rapid response . . . better co-ordination for the operator . . . from 5% to 10% faster cycle. Thoroughly proved in more than 5 years of field installations as well as on military aircraft and combat vessels. Now standard equipment on all P&H Electric Shovels — ready to give you increased production, lower tonnage costs!

**THE 1000th MAGNETORQUE*!** The most highly advanced means of power transfer yet developed — now proved on P&H Shovels in the most severe types of service. Here's smoother operation, extra power, greater bail pull. Electromagnetic operation makes it friction-free, wear-free, worry-free! Magnetorque lasts the life of the shovel.

**ONE RESPONSIBILITY.** All electrical equipment on P&H Electric Shovels is designed and built specifically for shovel service — not adapted for it. And P&H, the builder, takes the entire responsibility for service. There's no buck-passing among suppliers. P&H service is tailored to your needs.

Write for complete information.

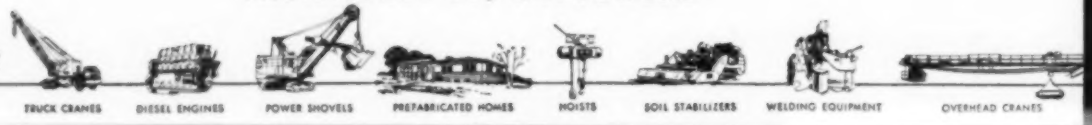
*T.M. of Harnischfeger Corporation for electro-magnetic type coupling.

P&H ELECTRIC SHOVEL DIVISION

**HARNISCHFEGER CORPORATION**

MILWAUKEE 46, WISCONSIN

the P&H Line



# Abolish "Waiting Around" Cable

Storing power cable like this is costly and unnecessary. The new power centers will help you eliminate such scenes. Thus you reduce the amount of cable in service and also keep it in better condition.

Simplex-TIREX PG and PCG Cables are designed especially to be used with this type of modern distribution system. As the working face advances, additional lengths of TIREX are coupled together. Only as much cable is used as is needed.

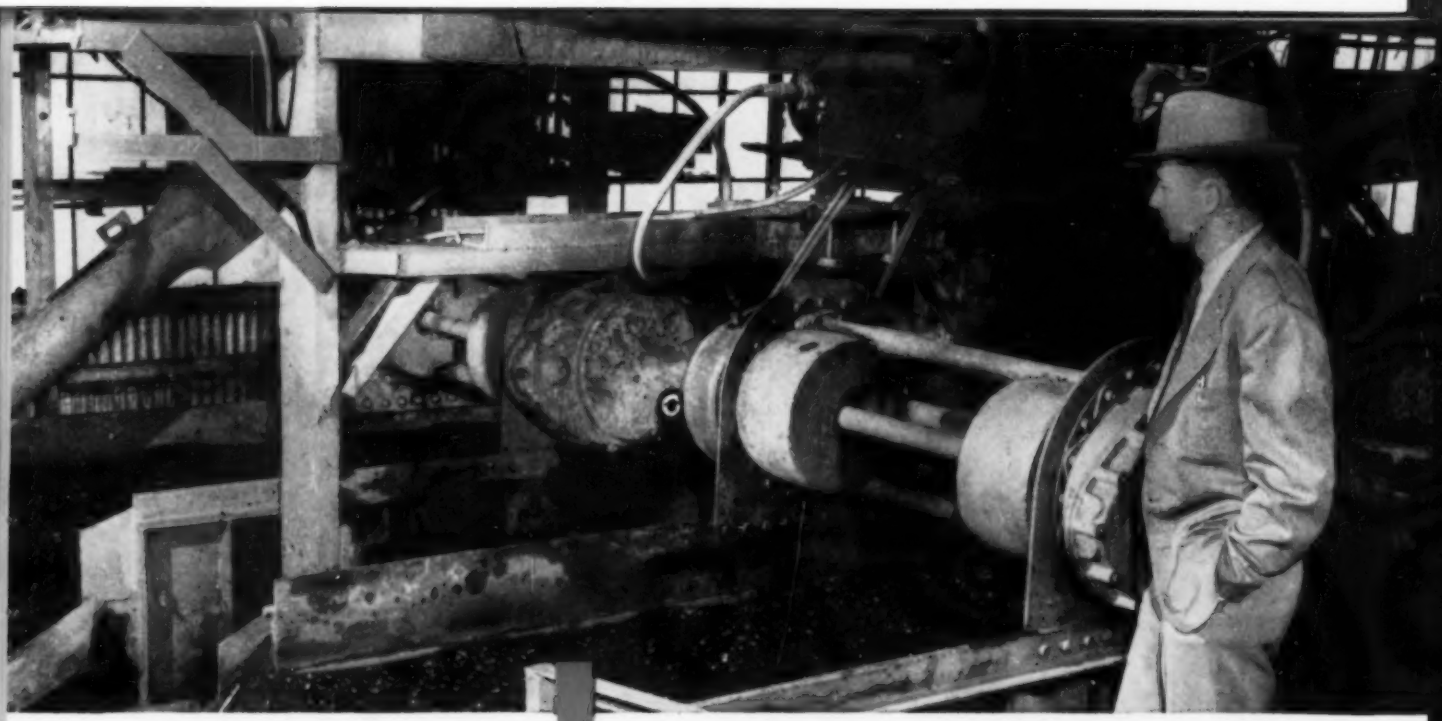
Elimination of using extra, "waiting around" cable just to have enough, results in substantial savings. Production jumps because less time is required to handle cable. Electrical safety increases through reduced electrical hazards.

All the famous features are included in Simplex-TIREX PG and PCG Cables: the cured-in-lead jacket, the Selenium Neoprene Armor, the flexible stranding and "P-101-BM" markings. Your local TIREX distributor has these cables or can get them quickly.

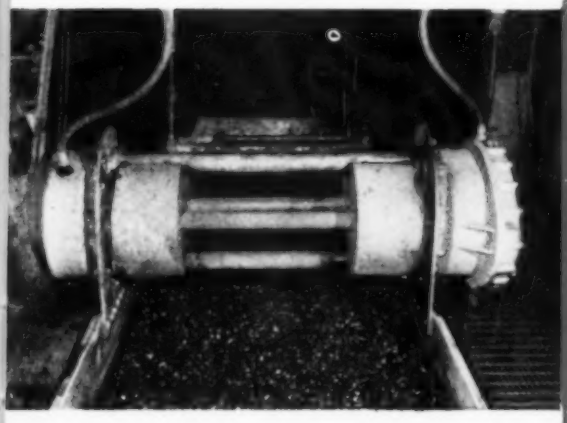
Simplex

TIREX CORDS AND CABLES *are made only by the*

**SIMPLEX WIRE & CABLE CO., 79 Sidney St., Cambridge 39, Mass.**



R. E. Wright, Standard lubrication specialist, inspects dewaterizers at Midland Electric processing plant, Middle Grove, Ill. Bob, a graduate of Michigan College of Mines with a B.S. in engineering and of Standard's Sales Engineering School, has the background and experience to provide technical service on lubrication problems. His customers find this training and experience pay off *for them.*



# STANDARD

## *helps shake lubrication problems out of dewaterizers*

A big problem at Midland Electric Coal Company, Middle Grove, Illinois, was dewaterizer lubrication. For years Midland Electric shut down dewaterizers for overhaul every one to three months. This meant a two-day shutdown of the dewaterizers while carbon deposits were removed from bearings or worn bearings replaced.

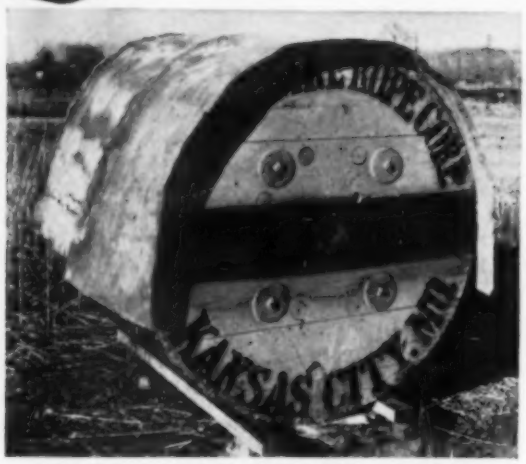
In October, 1951, Midland Electric consulted a Standard Oil lubrication specialist. He studied the job, learned what was required of the lubricant. Next step was to select a Standard Oil product that would eliminate the trouble. He found one: STANOLUBE S-1 Motor Oil. Result: Dewaterizers are now overhauled *once a year.* The oil has been used in these units since February, 1952. It shakes out the lubrication problem because it (1) resists carbonization (2) withstands both high temperatures and pressures (3) its detergent-dispersant qualities hold dirt in suspension, prevent deposit formation.

This is another example of an unbeatable combination at work (1) Standard Oil lubrication specialist capable of giving technical help and (2) a top quality product that *delivers results.* Maybe you would like to put this combination to work for you. In the midwest just call your nearby Standard Oil lubrication specialist. Or contact: Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Ill.

STANDARD

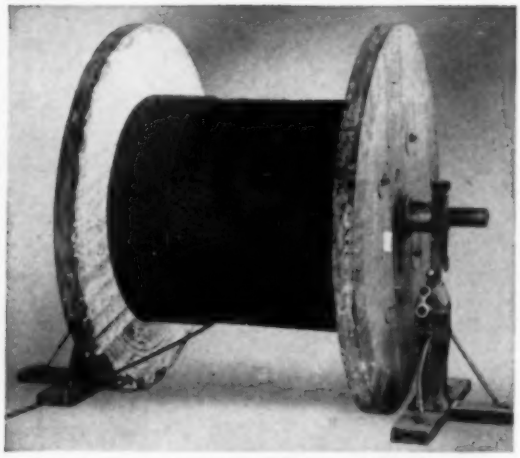
**STANDARD OIL COMPANY** (Indiana)

# Tuffy® tips on getting



## Store Rope Like This

Keep spare rope in a dry, sheltered place free of dust, vapors or fume-laden air. If stored out of doors, set reel on blocks off the ground. Clear away weeds and grass and protect with a waterproof covering as shown. Check each month for rust caused by moisture collecting on the rope. Paint with a heavy crankcase or cylinder oil if rust is discovered or even before it shows up if moisture is present.



## Unwind Like This

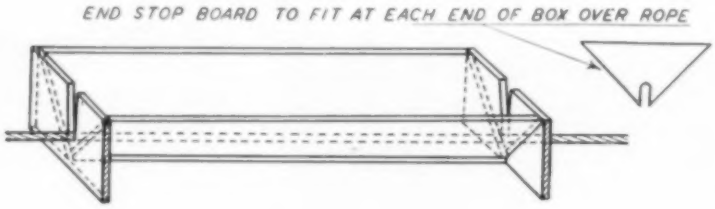
When getting ready to install the rope, special care should be taken to see that the reel is set up for smooth, easy unreeling. Set reel up on jacks as shown above and unreel so the rope pulls off from the bottom of the reel—*not* from the top. Coils should be put on a swift or rolled on the ground to pay off the rope. Kinks or "doglegs" may result from incorrect unreeling, seriously damaging wires of the rope and greatly reducing the ultimate life.

## Always Keep Rope Lubricated

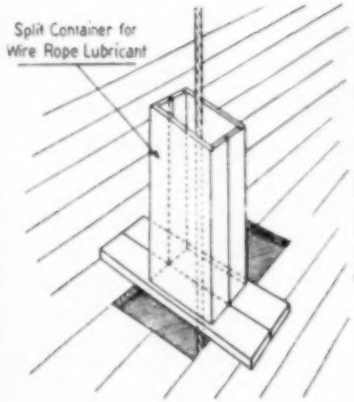
**Rope That Is Stored** for long periods of time should be lubricated during installation. If it is not possible to lubricate stored rope very often, apply a sealing compound to hold the lubricant that is already present.

**Rope In Use** can be lubricated most economically without removing it from the equipment on which it is operated. Lubricate rope as often as it needs it—service conditions determine the frequency.

**Use Lubricant Hot or Cold,** depending on its penetrating qualities. Your local oil company engineer will be able to recommend an oil that will actually penetrate to the working parts of the rope, and not just form a coating that peels off the first time your rope runs through a sheave.

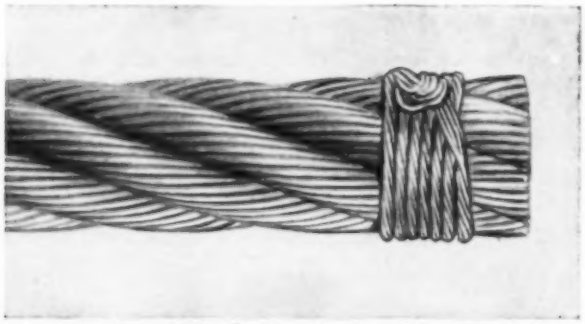



## Two Home-Made Oiling Devices



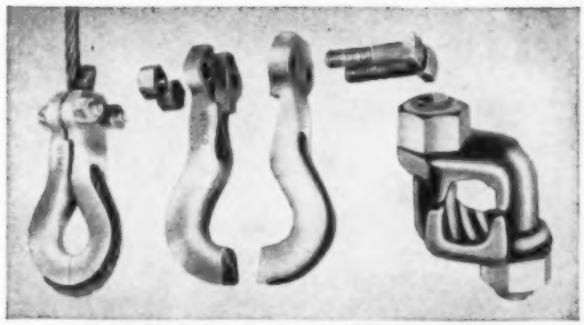

*These two oiling devices can be used without removing the wire rope from the equipment on which it operates. One is for vertical ropes, the other for horizontal ropes.*

# extra service from *Wire Rope*



## Seize Tightly For Cutting

Cutting can throw the strands out of fabricated position and, in time, result in kinks or doglegs. Seizing the rope securely before cutting, as shown above, assures that no movement of the strands can occur when you make cuts. Because most ropes are now preformed, and stress free, only one seizing wire at each side of the cut is needed.



## Attaching By Clipping

The fittings you use on wire rope can handicap it or enable it to work at full efficiency. Fittings which derive holding power by crimping action are harmful to the rope. Shown here are two rope clamps. One is a combination clamp and thimble. Both provide snug saddling of the rope and grip larger and uncrimped bearing surfaces so tightly that the loads are carried almost solely by the force of friction.

## Available To You: The *Wire Rope* Experience of Specialists

Working with users to whip wire rope problems has provided Union Wire Rope engineers a wealth of on-the-job experience. Out of this priceless experience has come a family of wire ropes for special purposes. Into them is put the grade of steel, the rope construction and operating characteristics which laboratory research and field development have proved best for the particular purpose for which made.

## Forget Complicated Specifications - Say Tuffy

**Tuffy Dozer Rope**

Mount a 150' reel of 1/2" or 9/16" on your dozer, cut off only worn sections, save good rope otherwise wasted.

**Tuffy Draglines**

Extra toughness for prolonged service. Flexible enough to hug the drum when casting. Extra resistance to abrasion. Cuts replacement costs.

**Tuffy Scraper Rope**

A special rope construction balanced to meet the tough, complex stresses which scraper service deals out.

**Tuffy Slings**

Proof tested for strength. Easy to hitch on and off. Kinking will not materially damage the 9-part, machine braided construction. Team up with Tuffy Hoist Line.

**Tuffy Slusher Rope**

Maximum rigidity to fight off drum crushing, yet flexible on small tail sheaves. A unique, high strength 3-strand construction with high abrasion resistance.

### Your Tuffy Distributor Works to Learn Your Business

When new equipment comes out, he has already checked into it... finding out why it does the job better, how it works. Why? Because he's interested in earning your continued patronage. And part of that service is helping you out with fast answers *when* you need them—especially right answers to your wire rope problems. Give him a call.

**union** *Wire Rope* **corp.**

2130 Manchester Avenue Kansas City 26, Missouri

*Specialists in High Carbon Wire, Wire Rope and Braided Wire Fabric*

1-M

# FOR THAT EXTRA MARGIN IN SHOVEL PERFORMANCE...


## WARD LEONARD ELECTRIC EXCAVATORS

MORE OUTPUT even under the toughest conditions . . . more loads per shift in any quarry or mine . . . extra loads for that EXTRA MARGIN in performance . . . that's what you get from this exclusive combination of shovel front-end features:

1. **TWO-SECTION BOOM** provides maximum strength with minimum weight. The lower section is rigidly connected to the A-frame . . . takes the heavy stresses of the digging cycle in stride because it is part of the main machine.

2. **TUBULAR DIPPER HANDLE** is much lighter than equivalent two-member handle, yet equally strong. Its ability to rotate in the rubber-cushioned saddle block eliminates torsion during the digging stroke, minimizes shock loads.

3. **TWIN DUAL HOIST ROPES** assure a steady, positive digging action with automatic shift of hoist power to that part of the dipper lip where it is needed.

4. **INDEPENDENT ROPE CROWD** is simple, positive and quiet. Shipper shaft pinions and handle racking are eliminated. Crowd machinery is located on main deck rather than on boom — swing inertia is reduced, the operating cycle speeded up.

5. **QUICK CONVERTIBILITY** to dragline of the independent motor type. Hoist and drag functions are powered by separate motors, eliminating operating clutches and brakes. 5154

*These features — plus many more — make Bucyrus-Eries the finest heavy-duty excavators ever built: yard for yard, dollar for dollar, pound for pound. Write today for complete information on the 4½-yd. 110-B, the 6-yd. 150-B, or the 8-yd. 190-B.*

**Bucyrus-Erie Company**

SOUTH MILWAUKEE
WISCONSIN

# Eaton 2-speed Axles have 4 Planetary Gears to share the load

- Gear-tooth loads are distributed over several rugged gear teeth.
- The husky planetary pinions turn only in the low speed range; in high speed they are locked out.
- Stress and wear are reduced to a minimum.
- Gear speeds are slower.
- Quiet operation and easy clash-free shifting are assured at all truck speeds.
- Long life and trouble-free operation are proven through actual performance records.
- Simple common-sense design assures easy, low-cost maintenance.

**Ask your truck dealer for complete information.**

**More than Two Million Eaton Axles in Trucks Today!**

**EATON** AXLE DIVISION
MANUFACTURING COMPANY
CLEVELAND, OHIO

**PRODUCTS:** Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

# Roof Bolting Makes a Better Mine

You make any mine better, safer, more productive, when you put in roof bolts to replace old-fashioned roof supports. This is because roof bolts consolidate strata into a single-unit thick beam.

Besides promoting safety, roof bolts also help to increase production, because they make possible wider openings and clearances, and increased room in which to operate mechanized equipment. And because of the absence of space-consuming supports, ventilation is improved.

Described here are four Bethlehem roof bolts, any one of which will help you obtain these safer operating conditions.

## SQUARE-HEAD BOLTS

Made in three types: (1) a ¾ in. carbon-type bolt having minimum breaking load of 20,000 lb; (2) a ⅝ in. high-strength bolt, having same breaking load, and (3) a ⅞ in. high-strength bolt with minimum breaking load of 40,000 lb. The ⅞ in. bolt is intended for use with Bethlehem's matching-halves Type F expansion shell. The ¾ in. and ⅝ in. bolts may be used either with the Type F shell or the 4-leaf Type C shell.

For use with headed bolts, Bethlehem also makes a hardened washer. It reduces the friction between the bolt head and the roof plate that occurs when high tension in the bolt produces excessive bearing pressure. The washer permits the free use of impact wrenches, without galling or tearing of metal.

## SLOTTED BOLT

A 1-in. bolt, with a centered, forged slot. No metal is removed in slotting. Opposite end of bolt has 5 in. of rolled threads. Bolt is for use with steel wedge, in 1¼ in. hole. When bolt is driven, wedge is forced into slot, expanding bolt-end. Truncated-cone point prevents thread damage. Usually comes with American Standard regular square nut.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

*On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation*

**BETHLEHEM MINE ROOF BOLTS**

BETHLEHEM STEEL

an ACCO product

# American Cable "Green Strand" Wire Rope

## What Wire Rope Do You Use on Your Carrier Scrapers?

• A complete description of a scraper cable is as long as your arm. But all you have to remember, if you are buying American Cable, is simply: TRU-LAY Streamlined Scraper Cable. And here's what you get, and why—

**6 x 25 Flattened Strand**—This means six strands of twenty-five wires each wound around triangularly shaped wires in the center of each strand. One flat side of the center wires of each strand faces out providing a relatively flat surface on the strand. The outsides of the six strands together make a smoother surface which gives the rope a much better bearing area against small sheaves and drums.

**Independent Wire Rope Core**—This adds considerably to the rope's breaking strength, and provides a solid steel core which keeps the rope from pulling down or flattening out on the small sheaves of a carrier scraper.

**Lang Lay**—When the wires in the strands are laid in the same cross-direction as the strands in the rope, the rope is Lang Lay. This makes the rope last longer because more of the outside wires are exposed to wear. It also makes the rope withstand more bending because of the helix of the wires. The crankiness of Lang Lay is removed by American Cable by preforming.

**TRU-LAY Preformed**—American Cable's Streamlined Scraper Cable is preformed to make it handle easier and last longer in bending around small sheaves. When wires do break, they stay in place instead of barbing out to slice hands and snag clothing.

**Improved Plow Steel**—That's what TRU-LAY Preformed is made of. The wire in this all-steel wire rope has an average tensile strength of 260,000 pounds per square inch. Look for the *green strand* which identifies this strong wire rope.

**Just ask for** TRU-LAY Streamlined Scraper Cable next time and every time you need rope for your carrier scrapers. You can also use it for the blade rope on your bulldozers. Your American Cable distributor stocks it and can give you quick service. Call him today or write our Wilkes-Barre, Pa., office for further information.

ACCO

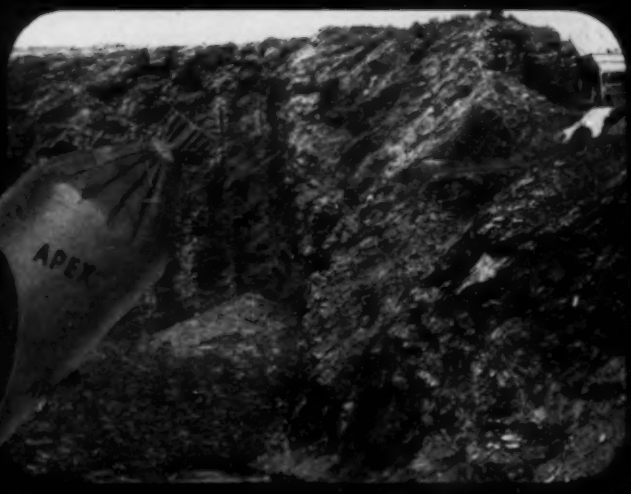
American Cable Division

AMERICAN CHAIN & CABLE

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, Portland, Ore., San Franscisco, Bridgeport, Conn.

plus ACCO Registered Wire Rope Slings

# Break it up to bite size...with APEX®




VERSATILE APEX explosives are an important factor in the amazing improvements in breakage now possible with the newest Atlas development . . . Alternate ROCKMASTER® combined with Alternate Velocity Loading.

Apex is an economical ammonium nitrate explosive with a patented assembly having a water-proof gelatin core that offers these advantages:

- **The water-proof core promotes complete detonation of the explosive in wet holes.**
- **Complete propagation of the column in any height face.**
- **Fluted-end cartridge permits easy loading.**
- **A wide range of strengths and velocities to choose from. Apex is available in 8 strengths: each in low, medium and high velocity.**

For maximum breakage, better control of throw and economical production, team APEX explosives with the ROCKMASTER Blasting System.

For complete information on all Atlas Explosives Products, ask your Atlas representative for a copy of the new Atlas Explosives Catalog.

ATLAS

## ATLAS EXPLOSIVES

*"Everything for Blasting"*

**ATLAS POWDER COMPANY,**
**WILMINGTON 99, DELAWARE**

***Offices in principal cities***

## *INTRODUCING THE*

# INTERNATIONAL DROTT 4-in-1 Skid Shovel

**BULLDOZER**—The bullclam is wide open and the rear of the bucket becomes the dozer. Depth of cut is regulated by forward and backward pitch of the blade.

**BULLCLAM**—By opening the clam 10 inches the cutting edge is lowered 2 inches. As the unit moves forward material boils into the bullclam.

**SKID-SHOVEL**—With clam closed, straight-forward loading of the shovel is accomplished by rolling the whole bucket forward to excavate. When filled it is rolled back over the Skid-Shoes to retain heaped load.

**CLAMSHELL**—Opening bullclam wide makes it possible to operate as a clamshell. Clam is brought down into material and closed by hydraulic pressure.

## Hydraulic Selector Lever Converts Latest Addition to INTERNATIONAL DROTT line into a...

**❶ BULLDOZER ❷ BULLCLAM**

**❸ SKID-SHOVEL ❹ CLAMSHELL**

Here's the unit that answers every requirement for a single machine capable of handling a wide variety of jobs.

It's the NEW 4-in-1 multipurpose addition to the famed INTERNATIONAL DROTT Skid-Shovel line and it's available on INTERNATIONAL TD-6 and TD-9 crawlers.

The 4-in-1 can immediately be changed into a Bulldozer, Bullclam, Skid-Shovel or Clamshell by merely shifting the "shovel-selector" lever into the desired position. The lever is at the operator's finger tips, and shovel selection can be made whether the tractor is in motion or standing still. For fast loading of any material, the 4-in-1 can be operated either as a forward dump or bottom dump shovel.

Like all products in the INTERNATIONAL DROTT line, the new 4-in-1 reduces wear and strain on the tractor by transporting heaped loads on the exclusive Skid-Shoes. These same Skid-Shoes provide 300% greater break-out force than on competing shovels. There's the exclusive "Hydro-Spring" feature, too, that absorbs 70% of the shock normally encountered in front-end loaders for increased operator comfort and longer tractor life.

On specific earthmoving work such as excavating or loading the standard INTERNATIONAL DROTT Skid-Shovel is tops. But if you're looking for one machine to handle many jobs, the 4-in-1 is it.

For a demonstration, call your INTERNATIONAL Industrial Distributor today.

**DROTT MANUFACTURING CORP., MILWAUKEE 8, WISCONSIN**
**INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS**

FREE—NEW 4-IN-1 CATALOG

**INTERNATIONAL® DROTT**

**Drott Mfg. Corp.,**
**3841 W. Wisconsin Ave.,**
**Milwaukee 8, Wisconsin**

Gentlemen:
Please send the new 4-in-1 catalog to:

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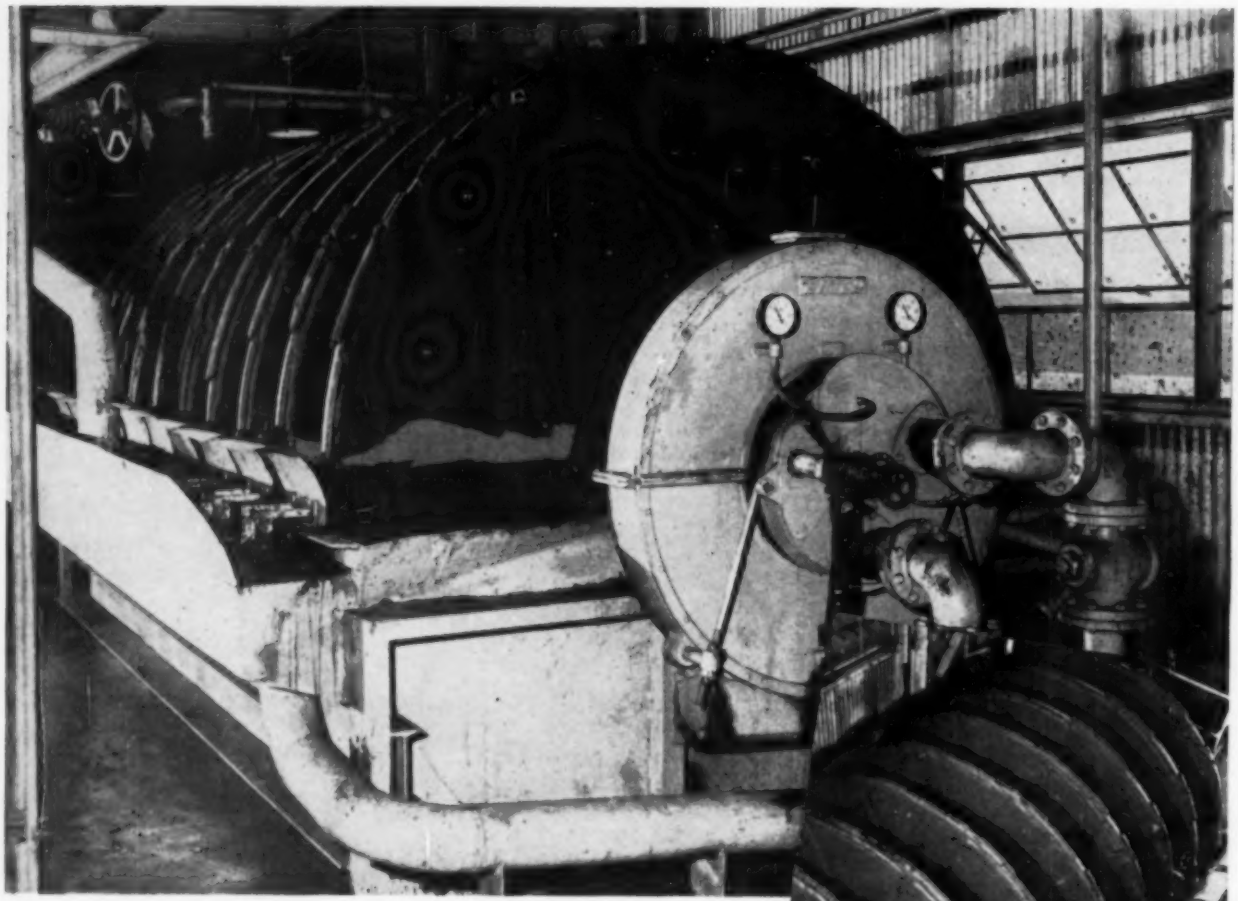


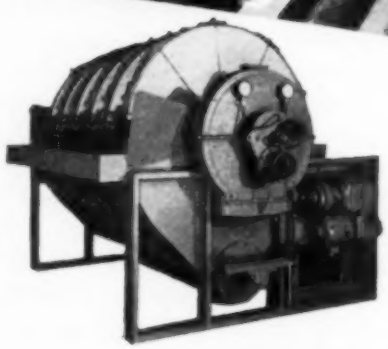
# RECOVER COAL FINES FROM WASHING PLANTS

Coal fines provide a substantial portion of the revenue producing product for a number of companies that have investigated and applied the simplest of all recovery equipment.

Eimco filters for dewatering fine coals have been found most economical for these flow sheets. Eimco filters are preferred to other dewatering equipment because they are a product of the oldest, most reliable firm producing this type equipment. Eimco's experience in dewatering fine coals dates back many years before any stream pollution laws. Eimco's products are always known for their heavy-duty, precision construction. Eimco's service policy guarantees performance.

When you consider recovering fine coals, let an Eimco engineer show you filters that produce more tonnage with less maintenance, occupy less floor space, and discharge cake with lower moisture content.

Write for specific information.

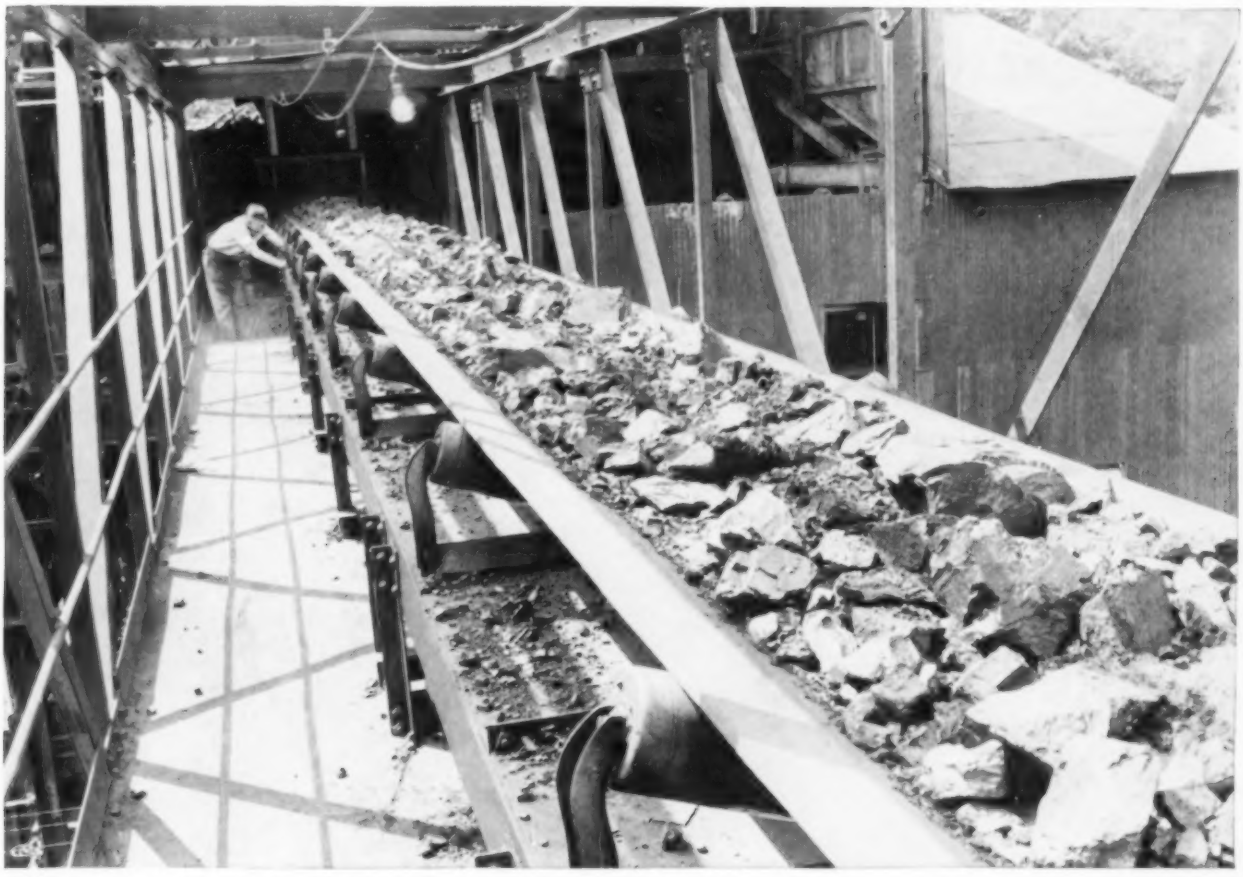


**THE EIMCO CORPORATION**

Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

New York, N. Y. Chicago, Ill. San Francisco, Calif. El Paso, Texas Birmingham, Ala. Duluth, Minn. Kellogg, Ida. London, Eng. Paris, France Milan, Italy

*You Can't Beat An Eimco!*



*Pittsburgh Coal Co. reports . . .*

# Installation of belt reinforced with Du Pont "Cordura" helps increase production 67% . . . reduces maintenance

**Reinforced** with Du Pont "Cordura", the 800-foot conveyor belt carries coal and rock to the hopper at the discharge end of the belt. From the hopper the coal and rock go to coal cars below.

Production has gone from 600 to 1,000 tons per hour since the installation of the fast-moving conveyor belt system shown above at the Montour #4 mine operated by the Pittsburgh Coal Company.

Reinforced with Du Pont Cordura* High Tenacity Rayon, the belt in this system carries coal and rock throughout rugged 100-hour work weeks. The company's Engineering Department recommended this belt, manufactured by the Goodyear Tire & Rubber Co., because of its long service life and the expectation of more tonnage. The company reports fewer men and much less maintenance are required since adopting a conveyor belt system of operation.

The extra strength of Du Pont "Cordura" permits a belt that's thinner yet stronger. And the *low stretch* of "Cordura" reduces costly downtime for take-up and resplicing.

Investigate the advantages of "Cordura" before ordering *your* next conveyor belt. Write for the names of suppliers . . . and send for free copy of the new booklet, "Mine & Quarry Facts About 'Cordura' ". Address: Textile Fibers Dept., Room 11504, E. I. du Pont de Nemours & Co. (Inc.), Wilmington, Del.

*Reg. U. S. Pat. Off.

Du Pont "*Cordura*" High Tenacity Rayon

STRENGTH AT LOW COST

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

This is Leatherwood Mine No. 2, Blue Diamond Coal Company, where foresighted management is getting its share of today's business with a new McNally Pittsburg coal processing plant.

Here is the most modern of equipment—flexible automatic machinery instantly adjustable to screen or rescreen, size, wash, and dry coal to exact specifications. All this at lowest cost, at 400 tons per hour input.

YOU, too, can COMPETE in today's market—and profit—but McNally Pittsburg equipment is a *must*. Write, today. Send brief outline of your problems.

**"BUILT BY MEN WHO KNOW COAL FROM THE GROUND UP"**

**McNALLY PITTSBURG**

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

**McNally Pittsburg Manufacturing Corporation, Dept. C, Pittsburg, Kansas**

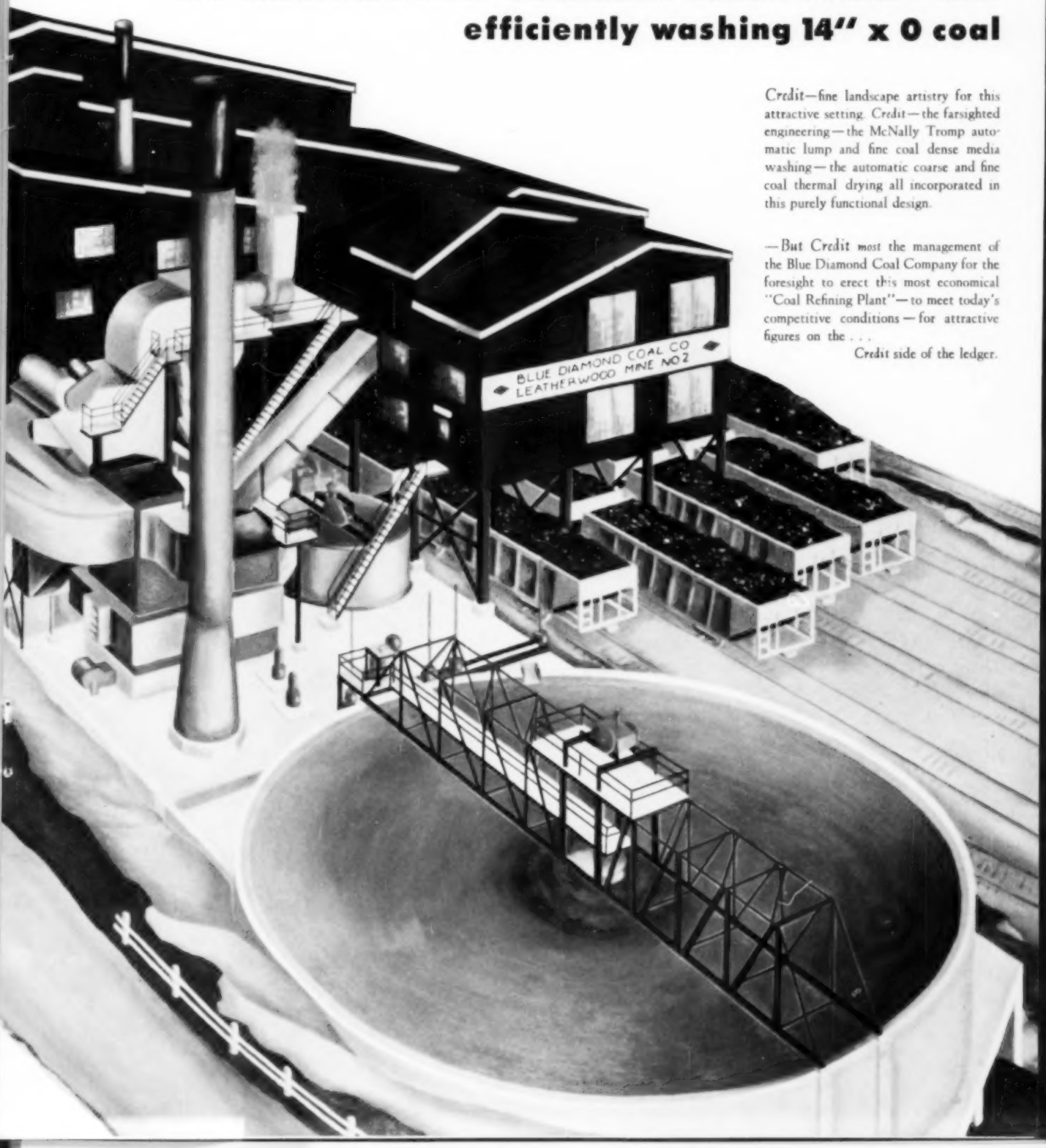
***Manufacturing Plants:* Pittsburg, Kansas • Wellston, Ohio**

**Engineering & Sales Offices: Pittsburgh • Chicago • Rio de Janeiro • Pittsburg, Kansas • Wellston, Ohio**

# *Beautiful.....Yes!*

## But the real beauty of it all is

## it's America's First Automatic Dense Media Plant efficiently washing 14" x 0 coal




*Credit*—fine landscape artistry for this attractive setting. *Credit*—the farsighted engineering—the McNally Tromp automatic lump and fine coal dense media washing—the automatic coarse and fine coal thermal drying all incorporated in this purely functional design.

—But *Credit most* the management of the Blue Diamond Coal Company for the foresight to erect this most economical "Coal Refining Plant"—to meet today's competitive conditions—for attractive figures on the . . .

Credit side of the ledger.


# "The right wire rope? That's *EASY* every time!"

IT'S A CINCH to pick the right wire rope for top performance in mining . . . and it pays off! Roebling's new catalog has a section devoted to rope for the mining field . . . shows at a glance the best rope for each purpose and gives you a simple, unique code number ordering system which for the first time in wire rope history *positively* identifies the desired rope.

Write for your copy of the new "Roebling Wire Rope Recommendations and Catalog." And remember that the Roebling Field Man at your nearest Roebling office or distributor is always available to help find the answer to special wire rope problems.

**ROEBLING** CF&I

*Subsidiary of The Colorado Fuel and Iron Corporation*



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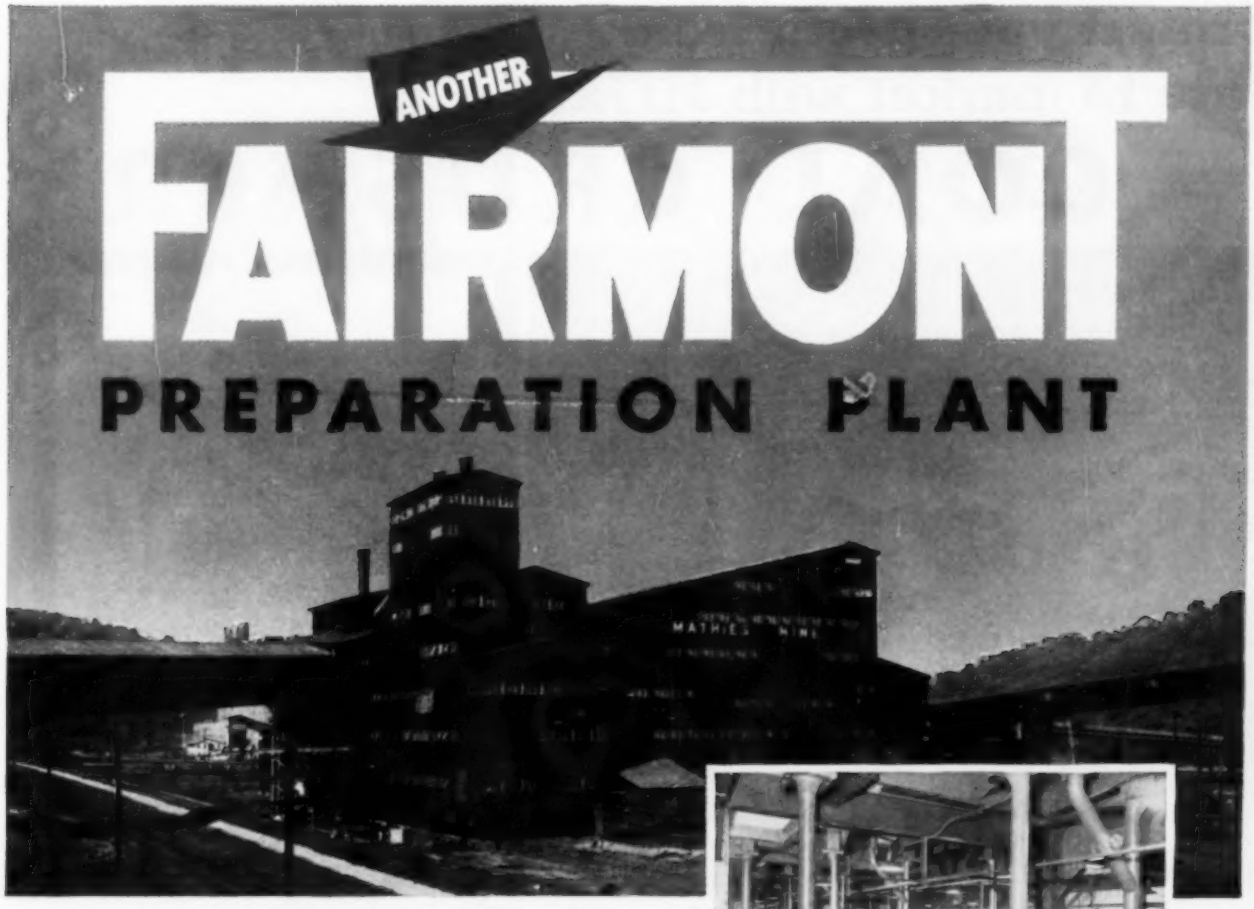
ANOTHER

# FAIRMONT

## PREPARATION PLANT



FAIRMONT-BUILT PLANT AT MATHIES COAL COMPANY AT MONONGAHELA, PA. CAPACITY APPROXIMATELY 1000 TONS PER HOUR.

*Something Extra*

PARTIAL VIEW OF TWENTY-SIX DEISTER SUPER DUTY DIAGONAL DECK NO. 7 COAL WASHING TABLES USED IN ABOVE INSTALLATION FOR CLEANING 5/16" x 0 SIZE. NOT SHOWN ARE TWO 13'-6" DIAMETER CHANCE CONES FOR CLEANING 8" X 5/16" SIZE.

## ...in cleaning coal for by-product purposes

When coal must meet the exacting requirements of by-product purposes, Fairmont-built plants are designed to guarantee a day to day uniformity in ash and sulphur content.

Through coordinated responsibility in design, engineering, fabrication and erection, Fairmont plants result in "something extra" toward greater operating economy and production efficiency.

When you have a cleaning problem, let Fairmont assume the full responsibility of designing, building or modernizing a plant that guarantees product uniformity and over 99% separating efficiency through a wide size range in any tonnage capacity. CALL A FAIRMONT ENGINEER!

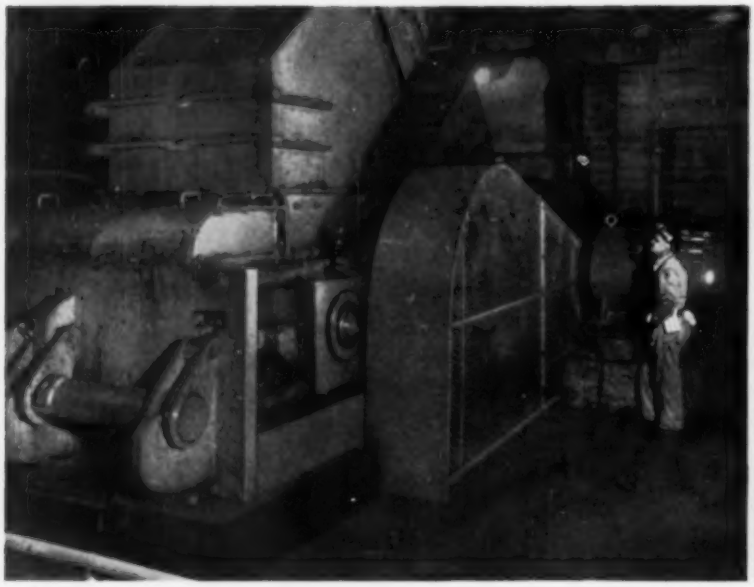
# FAIRMONT MACHINERY COMPANY

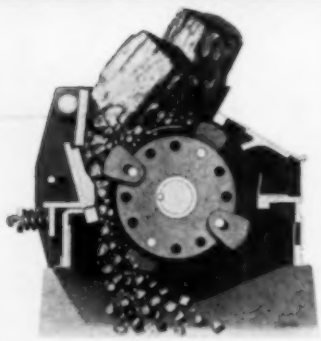
## FAIRMONT, WEST VIRGINIA

**DESIGNERS AND CONSTRUCTORS OF COMPLETE COAL PREPARATION PLANTS USING BOTH WET AND DRY CLEANING, CENTRIFUGAL AND THERMAL DRYING.**

# protect your profit from face to market with JEFFREY

# COAL CRUSHERS





Heavy-Duty Double Roll Jeffrey Crusher (left) has handled more than 5 MILLION TONS during the last six years without a breakdown. Cross section shows Jeffrey Heavy-Duty Slugger-Type Crusher.

Today's coal production demands utmost economy from mine face to market. Wide range of Jeffrey crushers meets every capacity and product requirement with money-saving efficiency. The right Jeffrey units, at work in your plant, mean smoother operation and greater profits.

**Heavy-Duty Double Roll Crushers** (in 3 sizes) handle the entire output of a mine, crushing everything that comes from the face without preliminary sizing or picking. 250 to 1500 TPH production in primary or secondary operations. Easy adjustments guarantee exact cubical product desired. Shear pin safeguards against uncrushable materials. Shipped knocked-down for assembly at mine.

**Heavy-Duty Slugger-Type Crushers** reduce mine refuse to minus 8" for belt feeding and safe gob pile disposal.

**Standard Double-Roll Crushers** reduce lump coal to 1½" and larger.

**FLEXROLL Crushers** take lump coal up to 10" and reduce it to stoker size in one operation.

**FLEXTOOTH Crushers** reduce all grades of R.O.M., Lump, Egg, Nut to domestic stoker sizes in one operation.

**Single Roll Crushers** enable mines to reduce surplus lump coal to acceptable 1½" and larger sizes.

Each Jeffrey coal crusher has definite advantages for certain specific mine operations. Our staff of specially-trained coal reduction engineers will gladly analyze your crushing problem without obligation.

*Write for catalog No. 784-B*

THE JEFFREY MANUFACTURING CO.

ESTABLISHED 1877

Columbus 16, Ohio

*sales offices and distributors in principal cities*

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

**IF IT'S MINED, PROCESSED OR MOVED**

***. . .IT'S A JOB FOR JEFFREY!***

# there's a reason it's not freezin*

1. **FREEZE PROOF**—Permatreated coal resists freezing and eliminates frozen car pockets
2. **DUST PROOF — ODORLESS**—Permatreated coal insures dustless delivery and odorless storage
3. **DECREASE WATER ABSORPTION**—Permatreated coal repels water
4. **IMPROVE BTU VALUE**—Add 300,000 BTU per ton for each 1% reduction in moisture
5. **AVOID CORROSION**—Non-corrosive Permatreat can't pit or corrode stoker equipment
6. **MAINTAIN QUALITY**—Permatreat reduces deterioration from weathering
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8. **CONTROL BULK DENSITY**—Permatreat insures uniform coke production and quality

* *Coal treated with . . .*

**Ashland**
**PERMATREAT**
**COAL SPRAY**
*seals in dust*

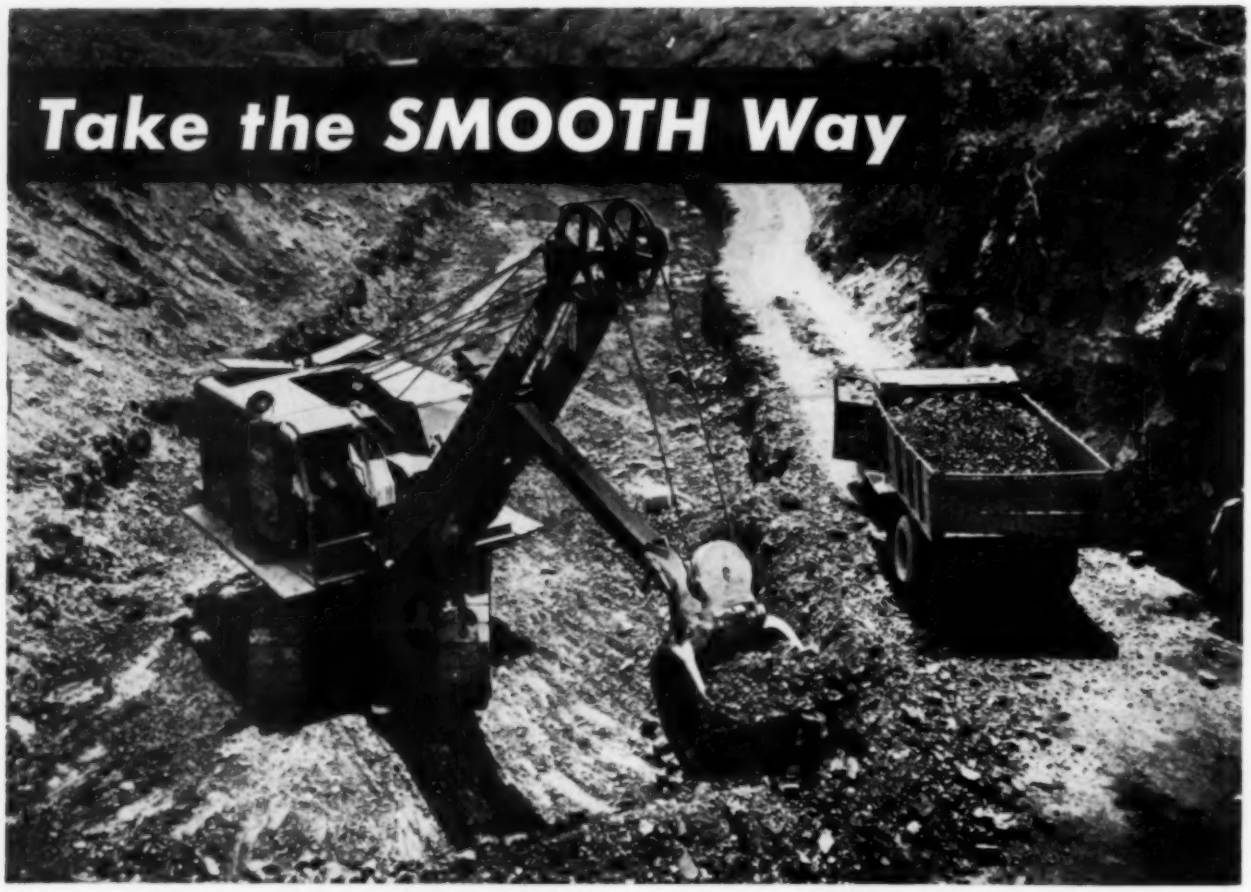
*"lasts the life of the coal"*

**Interested? Write, wire or phone**

## ASHLAND OIL & REFINING COMPANY

**Ashland, Kentucky**

**Special Advisory Service available from nationally recognized authorities on coal treatment.**




# To Bigger Output

Measure an excavator's output potential not only by size, weight, and horsepower but also by its ability to dig, swing, and dump in a fast, smooth, continuous motion. That's where Bucyrus-Erie Individual Design makes such a big difference.

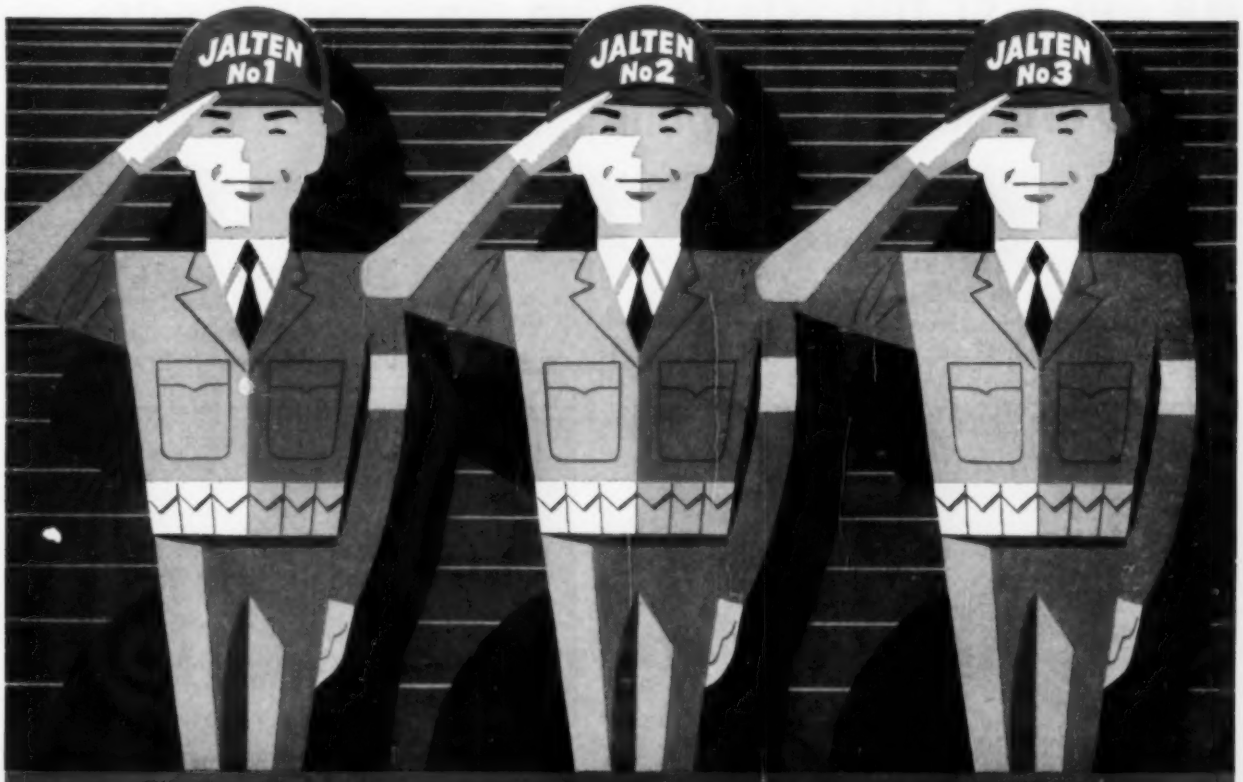
Each model in the Bucyrus-Erie line is built from the ground up to handle its rated load most efficiently. Power, weight, speed and strength are all properly balanced for peak operating efficiency. The result is fast, smooth work cycles that materially boost your output, sharply cut your upkeep costs.

With a Bucyrus-Erie excavator in your pit, you'll find you can load higher tonnages of coal shift after shift. See your local Bucyrus-Erie distributor now for the full story! 49E54

BUCYRUS ERIE

**BUCYRUS-ERIE COMPANY** South Milwaukee, Wisconsin

• 3/8-to 4-yd. gasoline, diesel, or single motor electric convertible excavators •




# Give your order...

## THEY'RE ALL JALTEN!

J&L's New JALTEN series enables you to select low-alloy, high-strength steel in the following combinations of advantages:

**JALTEN No. 1** — High strength, good formability and fabricating —good resistance to low temperature impact.

**JALTEN No. 2** — High strength, moderate forming—improved resistance to atmospheric corrosion.

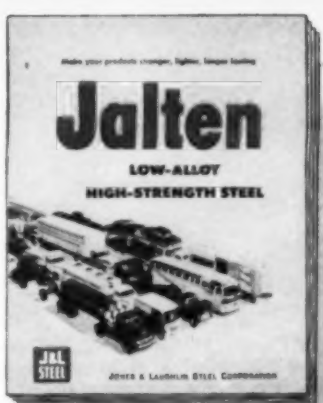
**JALTEN No. 3** — High strength—improved resistance to abrasion.

**Remember to specify JALTEN High Tensile Steel for**

- **HIGH STRENGTH • RESISTANCE TO CORROSION**
- **GOOD FORMABILITY • RESISTANCE TO ABRASION**

J&L STEEL

*Jones & Laughlin*
STEEL CORPORATION — *Pittsburgh*




**The data you want is in this book:**

- Chemical Properties of Jalten
- Mechanical Properties of Jalten
- Jalten Equivalents
- Jalten Application Data

Jones & Laughlin Steel Corporation
Dept. 411, 3 Gateway Center, Pittsburgh 30, Pa.

Please forward a copy of your booklet, Jalten low-alloy, high-strength steel.

Name_____

Company_____

Address_____

# "We get just the strength we need in 'Monobel'® AA– it breaks up our 'boney,' gives large lump"

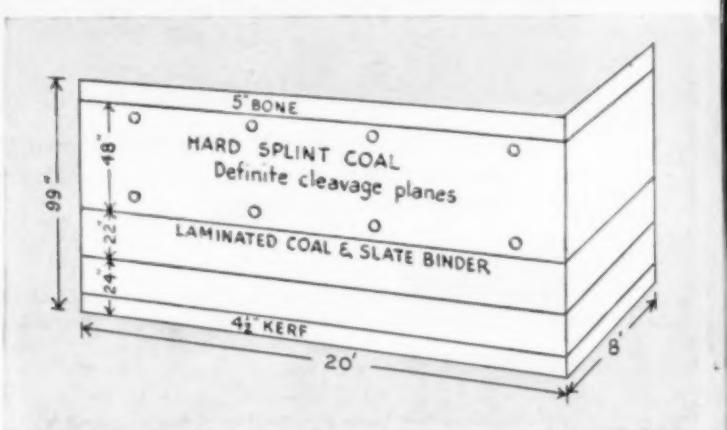
*reports L. F. Workman, General Manager, Lorado Coal Mining Company, Lorado, W. Va.*

"No matter what method we tried, the 22-inch 'boney' in our No. 7 Mine used to give us trouble. Either they broke it in large lumps, which slowed us down, or powdered it —and you know what high ash means! Then we tried Du Pont's 'Monobel' AA, and switched to it 100%. It's just what we need. Throws the 'boney' clear of the coal in easy-to-handle sizes, produces large lump and shears ribs and face clean, right to the back of the cut."

**1. SOUNDING** the roof. Shot has pulled all the way to the back of cut, squaring up the face. And note the straight-sheared ribs consistently obtained with "Monobel" AA.

**2. LOADING** charges after undercutting—operator tamps hole just above 22" laminated coal and slate binder. Now watch how this thorny shooting problem is cut down to size!

**3. HEAVING** action of Du Pont "Monobel" AA breaks the "boney" well and throws it clear, while giving a high percentage of coarse, quick-loading, easily cleaned coal.




**4. WORKING** hand in hand with the Lorado people, Du Pont technical service men helped devise the efficient shooting pattern shown above. All rooms in this mine are undercut.

Binder problem? Looking for firm lump? Du Pont "Monobel" AA can help you on both counts. It breaks coal and slate down to loadable size, with a minimum of "fines"—leaves a clean, straight face. Convince yourself by testing "Monobel" AA soon. For complete information, contact the Du Pont man in your district or write: E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Wilmington 98, Del.

**DU PONT**
**PERMISSIBLES**
*Blasting Supplies and Accessories*

DU PONT
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BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

# *now—the logs are lighter with* MUSCLES OF STEEL

Gone are the days when muscles of man and beast were the only means of loading and hauling big timber out of the woods. Supplying present-day lumber needs is a job that would lick ten thousand Samsons.

It's a job that demands *muscles of steel*—rugged wire rope that lifts and pulls the heaviest logs with strength to spare.

We of Wickwire play a big part in furnishing these *muscles of steel* to American industry. Wherever wire rope is used—timbering, drilling, construction, mining, fishing, materials handling—there also you'll find Wickwire Rope helping to do a better, more efficient job. That's the reason for the quality and extra care that go into its making.

***every industry benefits from wire rope***

**WICKWIRE ROPE**

CF&I PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION


2535

THE COLORADO FUEL AND IRON CORPORATION—Alliance (Tex.) • Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
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DEUTZ®

# Let it sleet! Let it snow!

**YOU STILL CAN HAVE**
**FREE-RUNNING COAL...**
**SATISFIED CUSTOMERS**


## Freezeproof your coal with

# MORTON FORMULA 5

Eliminate costly delays in unloading frozen coal. Keep your customers completely satisfied by shipping them coal freezeproofed with Morton "Formula 5." It saves them time, labor, and money.

Morton "Formula 5" is an inexpensive, free-pouring, dry product composed of sodium chloride (30-70 mesh) and a special anti-corrosive compound.

"Formula 5" is effective at subzero temperatures. Needs no mixing, no extra handling. Apply dry, direct to coal.

- **Harmless to coal, harmless to hands and clothing of workers**
- **Can be used for conveyor equipment, switches, tracks, etc.**
- **Readily available—comes in tough, 100-lb. bags**

**Informative free booklet**
**Send for your copy today**

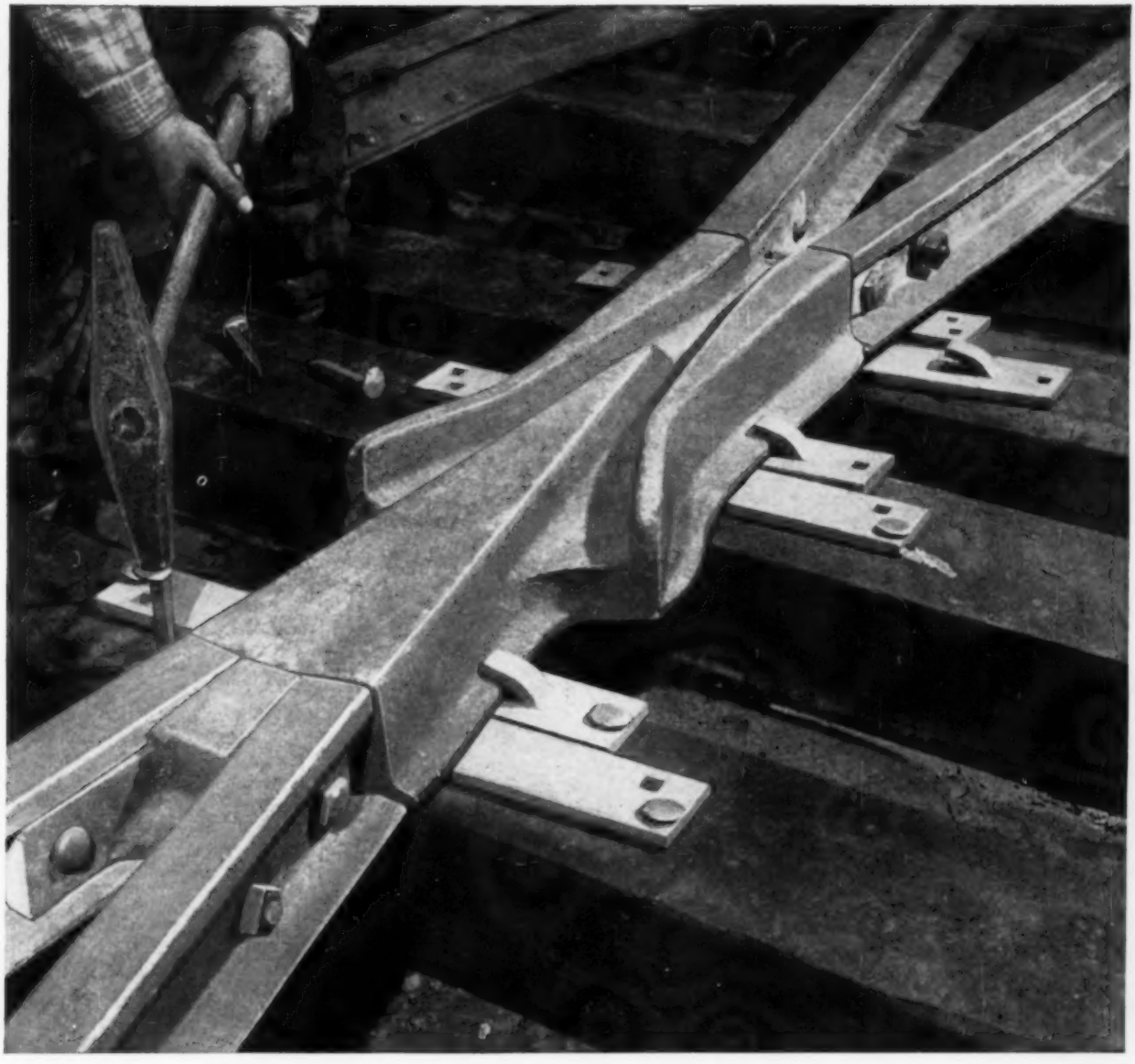
**You get all these extra benefits with the only freezeproofing product made exclusively for the coal industry—Formula 5**

- **Scientifically treated to produce an ideal dissolving rate and minimize loss during initial draining**
- **Will not lump in feeder**
- **Contains a rust inhibitor to protect your equipment**

**MORTON SALT COMPANY,** Industrial Division
Chicago 3, Illinois, Department CA-1

**Please send me your free booklet on "Formula 5."**

Name_____
Company_____
Street_____
City_____ Zone____ State_____



# Anchor any frog with this one type of frog plate

This picture shows how any matching pair of Bethlehem Twin Hook Frog Plates can fit any tie position under the frog. Makes no difference what the size or angle of the frog, this one type of plate can handle them all. No doubt one size plate will fit all the frogs in your mine.

Twin Hook Frog Plates really anchor the frogs, too! The hooks, larger and stronger than ordinary spike heads, are an integral part of each plate. Once in place, they'll absorb terrific side-thrust without loosening, and minimize any lifting effect on the frog itself.

By standardizing on Twin Hooks, you can eliminate the large and confusing array of conventional frog plates, thus lowering inventories in the stock rooms. Just lay any pair side by side on the tie, engage the frog base with the sturdy forged hooks, then fasten down with regular track spikes. It's as simple as that!

Plates are stocked in 20-in. and 23-in. lengths with hooks to fit all weights of rail. They're inexpensive, both to buy and to install, and require practically no maintenance. We'll be glad to supply complete details at your request.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

*On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation*

BETHLEHEM STEEL

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(NON-EXPLOSIVE MINING METHOD)

## THESE 235 MINES

## *Are Now Using*

### EITHER CARDOX OR AIRDOX MINING METHODS

#### VIRGINIA

Blackwood Fuel Company, Inc.
Buchanan County Coal Corporation (2) *
Coal Processing Corporation
Harman Coal Company
Margaret Ann Coal Corporation
Sycamore Coal Corporation
Wallen Coal Company

#### WEST VIRGINIA

American Coal Company (2)
Ames Mining Company (2)
Anchor Coal Company
Boone County Coal Company
Brule Smokeless Coal Company
Carbon Fuel Company
Clear Creek Coal Company
Coalburgh-Kanawha Mining Company
Crozer Coal and Coke Company (2)
Eastern Gas and Fuel Associates
Ethel Chilton Mines
Gay Mining Company (2)
Gulf Mining Company
Guyan Eagle Coal Company
Hoylman Coal Company
Island Creek Coal Company
Imperial Smokeless Coal Company (2)
Jacob's Fork Pocahontas Coal Company
Johnstown Coal & Coke Company
Kimberling Collieries Company
Lafayette Springs Coal Company
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Lorado Coal Mining Company
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Maust Coal & Coke Company
Mt. Hope Coal Company (3)
Nassau Coal Company (2)
New River Company (3)
Olga Coal Company
Pardee and Curtin Lumber Company (2)
Pecks Run Coal Company
Peerless Coal & Coke Company (2)
Peters Creek Coal Company
Pond Creek Pocahontas Coal Company (2)
Raine Lumber and Coal Company
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Tioga Coal Corporation
Truax-Traer Coal Company
United Pocahontas Coal Company
Warner Collieries
West Gulf Collieries
West Virginia Coal & Coke Corporation (3)
Weyanoke Coal and Coke Company (2)
Winding Gulf Collieries

#### KENTUCKY

Bell & Zoller Coal & Mining Company (2)
Big Jim Coal Company
Black Star Coal Corporation
Carrs Fork Coal Company
Cinderella Coal Corporation
Citation Coal Company
Columbus Mining Company
W. G. Duncan Coal Company, Inc. (2)
Eastern Coal Company
Fourseam Coal Corporation
Harold Fuel Company, Inc.
Harvey Coal Company (2)
Inland Steel Company
Jewell Ridge Coal Corporation (2)
Kentland Elkhorn Coal Company
Kirkpatrick Mining Company
Knott Coal Corporation
Liberty Coal Company
Liberty Elkhorn Coal Company
Marlowe Coal Company (4)
Mary Gail Coal Company
Russell Fork Coal Company
Smith Coal Company
Stephens Elkhorn Fuel Company (2)
Stoker Coal Company
Uniontown Coal Company
United States Steel Company (2)
West Kentucky Coal Company

#### TENNESSEE

Block Coal & Coke Company
Straight Fork Coal Company
Virginia Harlan Coal Company

#### PENNSYLVANIA

The Berwind-White Coal Mining Company
Butler Consolidated Coal Company
Cambria Clearfield Mining Company
Campbell Coal Company

## CARDOX CORPORATION

# ANNUAL *Roll Call*

Crichton Coal Company
Imperial Coal Corporation
Johnstown Coal & Coke Company.....(2)
Mathies Coal Company
Marco Coal Company
Moffitt Coal Company
Morrisdale Coal Mining Company.....(2)
Ontario Coal Mining Company
Pittsburgh Coal Company.....(5)
J. L. Sager Coal Company
Springfield Coal Corporation
Westmoreland Coal Company

## OHIO

Clean Coal Company
Columbia Southern Chemical Corporation
Dindo Coal Company, Inc.
The Farm Bureau Cooperative Association Inc.
Gem Coal Company
Hanna Coal Company of Ohio
Jefferson Coal Company.....(2)
Lorain Coal & Dock Company
Powhatan Mining Company
Warner Collieries Company

## ILLINOIS

Bell & Zoller Coal & Mining Company.....(3)
Belle Valley Coal Company
Blue Bird Coal Company
Carmac Coal Company
Chicago, Wilmington & Franklin Coal Company
Deer Creek Coal Company
Eddy Coal Company
Elk Coal Company
Freeman Coal Mining Corporation.....(2)
Mid-Continent Coal Corporation
Moffat Coal Company.....(3)
Old Ben Coal Corporation.....(3)
Peabody Coal Company
Pine Bluff Coal Company
Pschirrer & Sons Coal Company.....(3)
Sahara Coal Company
Truax-Traer Coal Company
Union Colliery Company
Wenneborg Coal Company
Wilkins Coal Company

## INDIANA

Enoco Collieries Company
Fairview Collieries Corporation
Ingle Coal Corporation
Linton Summit Coal Company
Princeton Mining Company.....(2)
Snow Hill Coal Corporation
Sullivan County Coal Company.....(2)
Viking Coal Corporation

## OKLAHOMA

Reliance Smokeless Coal Company

## COLORADO

Arrowhead Coal Company
Bear Coal Company
Black Diamond Fuel Company
Boulder Valley Coal Company
Canon Black Diamond Coal Company.....(2)
Canon Monarch Coal Company
Canon National Coal Company
Chandler Coal Company
Clark Coal Company.....(2)
Clayton Coal Company.....(2)
Colorado Fuel & Iron Corporation
Colowyo Coal Company
W. D. Corley, Jr.
Dry Creek Coal Company
Dunn Coal Company
Graden Coal Company.....(2)
Imperial Coal Company
Jenkins & Mathis Coal Company
Juanita Coal & Coke Company
Minerals Development
William E. Russell Coal Company
Taylor Coal Company
Tomahawk Coal Company

## MONTANA

Brophy Coal Company
Johnson Coal Company
Mountain State Mining Company
Nies Brothers
Northern Coal Company
Roundup Mining Company
Western Coal Company

## WYOMING

Colony Coal Company
Ronocco Coal Company
Storm King Coal Company

## UTAH

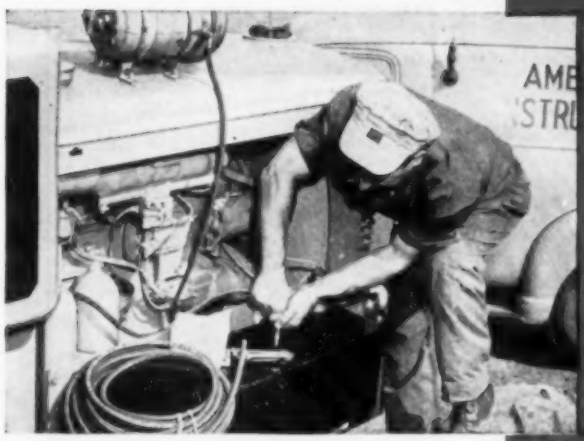
Hi-Heat Company
Kaiser Steel Company
Lion Coal Company

## ARKANSAS

Quality Excelsior Coal Company
Smokeless Coal Company

## CANADA

Amalgamated Coals Inc.
Century Coal Ltd.
Lethbridge Collieries, Ltd.....(2)
Red Deer Valley Coal Company, Limited
West Canadian Collieries, Limited.....(2)



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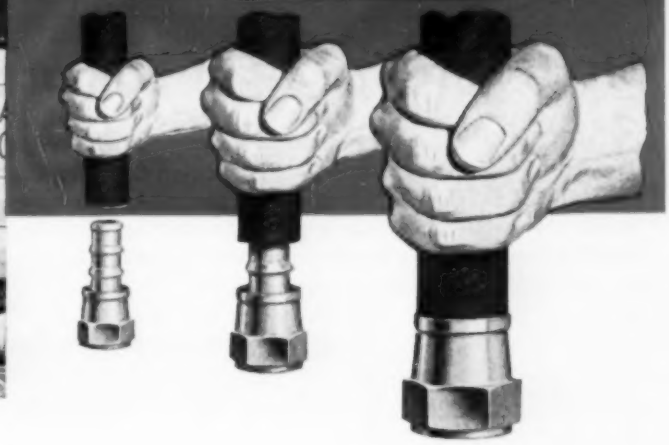
■ With bulk hose and a few fittings, hose lines can be made right in the field.

■ *SOCKETLESS* hose lines are flexible ... easy to install even in confined areas.

Master Mechanic Nick Martino of
American Construction Company, Inc.,
Hartford, Connecticut

*Makes and Installs Oil Lines in Minutes!*



"Aeroquip's superior quality hose and reusable fittings mean less headaches due to downtime, and great savings in future replacements," says Mr. Martino. "Aeroquip hose has completely eliminated our stocking problem; now we just cut the length of hose we need and push it on the fittings."

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**SOCKETLESS**

**FITTINGS AND HOSE**

Aeroquip

REG. TRADE MARK

**AEROQUIP CORPORATION, JACKSON, MICHIGAN**

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*{PLEASE GIVE THIS ADVERTISEMENT TO YOUR BLASTING FOREMAN.}*

# Give Yourself the Best Break...

## Start with the Right Primacord

PRIMACORD® is the registered trade mark brand name of all detonating fuse manufactured by The Ensign-Bickford Company. Controlled laboratory and field testing year after year has resulted in the development of many types of Primacord. For commercial blasting, the four types listed in the table below are recommended for use under the conditions shown:

| CONDITIONS | PRIMACORD RECOMMENDED | | | |
|---|---|---|---|---|
| | *Plain* | *Reinforced* | *Wire Countered* | *Plastic Reinforced* |
| Jackhammer holes | X | | | |
| Shallow well-drill holes | X | | | |
| Secondary blasting | X | | | |
| Deep, ragged holes | | X | X | X |
| Extra deep holes | | | X | X |
| Deep, wet holes | | | | X |
| When a field shot must stand a long time | | | | X |
| River Crossings | | | | X |
| Loading with heavily reinforced explosives containers | | | X | |

**For your Trunk Line,** Plain Primacord serves in most cases. You can use Reinforced Primacord to advantage, especially where the going is rough. **When thunder storms threaten,** or where high voltage cables may release stray electrical currents, always use Primacord. It is not affected by stray currents — and a direct hit by lightning failed to detonate it.

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**THE ENSIGN-BICKFORD COMPANY, Simsbury, Connecticut**

*Primacord — Quarrycord — Ignitacord® — Safety Fuse — Blasting Accessories*

*Established 1836* P-17

**PRIMACORD®**

**DETONATING FUSE**

**PROVED AND APPROVED**

**PLAIN PRIMACORD**

Textile-covered, flexible and resilient. Suitable for surface trunk lines and shallow holes where tensile strength and resistance to abrasion and cutting are not required. Tensile strength 113 lbs. 1000-ft. spool 17 lbs.

**REINFORCED PRIMACORD**

Textile reinforced, tough, resilient, flexible. Recommended for surface trunk lines and deep holes where normal strength and resistance to abrasion and cutting are needed. Tensile strength 160 lbs. 1000-ft. spool 18 lbs.

**WIRE COUNTERED PRIMACORD**

Textile or plastic cover is armored with wire. Recommended for use in deep, ragged holes or with metal or fibre explosives containers, where strength and resistance to abrasion and cutting are essential. Tensile strength 220 lbs. 1000-ft. spool 33 lbs.

**PLASTIC REINFORCED PRIMACORD**

Covered with tough plastic material, not affected by high Summer heat or Winter cold. Waterproof—resistant to acids commonly encountered. Use for extremely deep holes, river crossings, field shots that must stand for long periods of time and in other wet conditions. Tensile strength 250 lbs. 1000-ft. spool 22 lbs.

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

JANUARY, 1955

IVAN A. GIVEN, EDITOR

# Safety First

ROOF-BOLTING has been one of the most significant developments in coal-mining history, not only from the safety standpoint but by reason of its contributions to general mining efficiency. Now, having proved the technique by experience, the coal-mining industry is beginning to go into the question of refinements. Among those suggested are increased spacing in original installation, and recovery for re-use.

Those suggesting these two refinements make the very sound point that safety is the first consideration, and that increased spacing, recovery, or both should be instituted only where it is clear that the hazards are not increased. Since it costs $2 or more to put a bolt in, and it is possible to get back up to a $1 worth or more of material for as little as 25c or less in labor and other expenses in recovery, the savings possibilities are well worth investigating. But gains in safety are too hard won to lose, and caution definitely should be the watchword in modifying practices that are known to give results.

# Real Help

"INTELLIGENCE" is what military men call information of every type and kind bearing on the successful conduct of military actions. The better the intelligence, the easier it is to lay plans and carry them through to successful conclusion—in minimum time and at minimum cost in men and materiel. The basic rule also applies to business, including coal mining. In fact, in view of the present situation and future prospects, coal needs every fact and figure it can get for some time to come. That alone is good reason for welcoming and cooperating in the new census of the mineral industries, which starts this month and is accompanied by a census of manufacturers and a census of business. Coal can really help by replying promptly, replying fully and replying accurately.

# Forewarning?

NATURAL-GAS DEVELOPMENTS are today of sharp and direct interest to the coal-mining industry because increased gas use means less business for coal. Even more important in the long run, the rise of natural gas has provided an opportunity for the federal government to move farther into the fuels picture, not only to the detriment of the competitive power of coal but also on a track that could result in attempts to assume complete power over prices and end uses of all fuels.

Among those who see this as a distinct possibility in the future unless the present trend is checked is Gov. Allen Shivers, of Texas. Discussing FPC's assumption of regulatory power over natural-gas production at the winter meeting of the Interstate Oil Compact Commission of Dec. 3, Governor Shivers described the present situation this way: "The federal government is plainly in the natural-gas business and the position of private enterprise is tentative, to say the least."

The effect of FPC assumption of regulatory powers, Governor Shivers charged, is the "equivalent of nationalization of the energy sources of the United States." It will be noted that he used the phrase "energy sources" rather than "natural gas." There is good reason for this choice, since a chain reaction that might eventually lead to the FPC attempts to control all fuels to make its original order stick is not outside the bounds of possibility. Here is where all the fuels—coal, oil and gas—can make common cause, since all of them have a stake in preserving free competition and with it the opportunity to build markets on merit and service.

# More Kilowatts From Coal

**20,000,000-ton jump in coal purchases by electric utilities in 1955 will usher in a period of accelerated rise in coal burn**

By J. R. FORSYTHE
General Manager
Keystone Coal Buyers Manual
McGraw-Hill, New York

*NEW YORK, Nov. 29 (Special)*—The Ohio Power Co., subsidiary of the American Gas & Electric Co., announced today that it is acquiring 650 acres along the Ohio River near Ironton, Ohio, for a future 1,000,000-kw steam-electric generating plant.

Philip Sporn, president, Ohio Power Co. and A. G. & E., said construction of the plant would begin when the demand for electric service called for it. The Ironton site, he said, had been chosen for two reasons: proximity to coal reserves and location close to the center of the seven-state A. G. & E. system.

The system now has a generating capacity of 4,000,000 kw. An additional 570,000 kw of capacity is under construction or is to be started within 60 days.

* * *

*KANSAS CITY, Nov. 30 (Special)*—Kansas City Power & Light Co. has announced a 12-yr program for construction of an 800,000-kw generating plant in coal fields 70 mi southeast of Kansas City. Construction of the first 170,000-kw unit on a 5,000-acre tract west of Ladue, Mo., will start early in 1955, said Harry B. Munsell, president, and the fourth is scheduled for completion in 1967. Fuel will be trucked to the plant from strip mines within a 5-mi radius. Some 20,000 acres of coal reserves in the vicinity are owned by the Power Coal Co., a Sinclair Coal subsidiary.

Annual coal consumption at the plant will leap from 560,000 tons for the first unit, to be completed in the spring of 1958, to 2,700,000 tons when all four units are in operation.

BIG TODAY, and bigger tomorrow, more and more becomes the only accurate description of the electric-utility market for coal. The statement for today is nailed down by utility schedules of coal use, and for tomorrow by the regular announcement of big, additional coal-fired plants, such as the two reproduced at the left.

Looking at today's picture, the Nation's electric utilities will buy over 20,000,000 more tons of coal in 1955 than in 1954 for plant operation and building up stocks. This addition, the biggest annual increase in the history of utility fuel purchases, will accelerate the increasing reliance of the utilities on coal, and will push the use of coal by utility power plants to a new record of nearly 130,000,000 tons in 1955.

This forecast is based on expected fuel-use and storage schedules supplied by TVA and 61 other public and municipal electric utilities. These 62 electric utilities estimate their 1954 coal burn at 75,376,000 tons, or two-thirds of the estimated coal burn of all utilities in the United States.

Coal requirements for the boilers and stockpiles of new steam-generating facilities for the Tennessee Valley Authority and the atomic-energy program alone will total 11,526,000 tons in 1955. The remainder of the 20,000,000-tons increase in 1955 purchases will be accounted for by privately owned and municipal plants.

Coal-fired generating facilities to be added to the TVA system in 1955, and those being built by Ohio Valley Electric Corp., Indiana Kentucky Electric Co., and Electric Energy, Inc., to supply the requirements of Atomic Energy Commission facilities this year represent 4,325,000 kw of new capacity. These new units (shown in the accompanying table), to be brought in one after another in 1955, will burn about 7,300,000 tons before the end of the year. They also will help push the TVA coal burn up to 16,000,000 tons in 1955, against 9,148,000 tons in 1954 and 5,767,000 tons in 1953.

Stockpile requirements for these TVA and AEC-related facilities alone will total 4,234,000 tons, over and above what will be burned. In 1956, when these new plants run at capacity throughout the year, they will raise their burn 6,357,000 tons to the total annual consumption, by these new units alone, of 13,259,000 tons.

## Solid Growth Over All

Other privately owned companies and municipal plants in the Nation expect to increase their coal burn 3.3% in 1955, on the basis of reports from 58 of these organizations. Their expected coal-burning schedules up to 1959 are compared with performance in 1953 and 1954 in the accompanying table. Projecting from these figures, the total utility coal burn is expected to be 129,400,000 tons in 1955, rising to 167,700,000 tons in 1959, in comparison to 115,897,000 tons in 1953 and 117,000,000 tons in 1954.

Only ten of the organizations reporting estimated a decrease in coal burn in 1955, and the decline was quite small in each instance. Changes in the percentages of various fuels used favored coal—with one exception. That one organization reported that it expected to use more gas and less coal. Some companies reported that limited supplies and higher natural-gas prices, or higher prices for oil would spark the increase in coal use. Apparently, oil prices are not expected to rise as fast as natural gas, however, with one company reporting that both coal and oil would rise in the same proportion while gas use would go down rapidly.

### 1955 Coal-Fired Generating Buildup for TVA and AEC

| Plant | Capacity, Kw | Estimated Annual Burn, Tons | Additional Coal for Stockpiles, Tons |
|---|---|---|---|
| TVA, Shawnee, Ky. | 540,000 | 1,800,000 | 452,000 |
| TVA, Kingston, Tenn. | 720,000 | 2,224,000 | 556,000 |
| TVA, Colbert, Ala. | 720,000 | 2,000,000 | 500,000 |
| TVA, Rogersville, Tenn. | 360,000 | 1,000,000 | 250,000 |
| TVA, Gallatin, Tenn. | 225,000 | 675,000 | 156,000 |
| EEI, Joppa, Ill. | 360,000 | 1,360,000 | 200,000 |
| OVEC, Kyger Creek, Ohio | 600,000 | 1,800,000 | 900,000 |
| IKE, Clifty Creek, Ind. | 800,000 | 2,400,000 | 1,200,000 |
| Totals | 4,325,000 | 13,259,000 | 4,214,000 |

# How 62 Electric-Utility Organizations Will Use Coal to 1959

| | Burn in Thousands of Tons | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 |
| **TVA AND ATOMIC ENERGY** | | | | | | | |
| TVA | 5,765 | 9,148 | 16,000 | 17,400 | 18,000 | 19,700 | 21,600 |
| Ohio Val. Elec. | 0 | 0 | 1,146 | 3,182 | 3,350 | 3,350 | 3,350 |
| Ind. Ky. Elec. | 0 | 0 | 1,636 | 3,897 | 4,290 | 4,290 | 4,290 |
| Elec. Energy, Inc. | 522 | 1,630 | 3,400 | 4,060 | 4,060 | 4,060 | 4,060 |
| **PRIVATE AND MUNICIPAL** | | | | | | | |
| **NEW ENGLAND** | | | | | | | |
| Green Mtn. Pwr. | 0 | 25 | 62 | 68 | 75 | 82 | 90 |
| Conn. Pwr. | 115 | 110 | 110 | 110 | 110 | 110 | 110 |
| Connecticut P. & L. | 919 | 919 | 986 | 1,053 | 1,131 | 1,212 | 1,297 |
| West. Mass. Elec. | 353 | 355 | 355 | 355 | 680 | .... | .... |
| **MIDDLE ATLANTIC** | | | | | | | |
| Con. Edison | .... | 5,000 | 5,000 | .... | .... | .... | .... |
| Jamestown (N. Y.) Mun. | 83 | 79 | 78 | 78 | 78 | 78 | 78 |
| Public Service E. & G. | 1,467 | 1,634 | 2,064 | 2,370 | 2,450 | 2,240 | 2,380 |
| Cent. Hud. G. & E. | 195 | 240 | 300 | 325 | 340 | 360 | .... |
| N. Y. State E. & G. | 1,184 | 1,077 | 1,110 | 1,135 | 1,163 | 1,188 | 1,203 |
| Rochester G. & E. | 646 | 656 | 672 | 705 | 740 | 777 | 816 |
| Rockland L. & P. | 64 | 50 | 90 | 100 | 110 | 120 | 130 |
| Pennsylvania Elec. | .... | 1,800 | 2,000 | .... | .... | .... | .... |
| Pennsylvania P. & L. | .... | 2,350 | 2,500 | .... | .... | .... | .... |
| West Penn Pwr. | 2,144 | 1,861 | 1,693 | 1,878 | 2,075 | .... | .... |
| **EAST NORTH CENTRAL** | | | | | | | |
| Detroit Edison | 4,834 | 4,423 | 4,617 | 5,140 | 5,250 | 5,596 | 6,253 |
| Detroit Mun. | 156 | 165 | 167 | 173 | 181 | 175 | 184 |
| Illinois Pwr. | 1,362 | 1,497 | 1,579 | 1,700 | 1,826 | 1,957 | 2,097 |
| South Haven Mun. | 16 | 18 | 19 | 20 | 21 | 23 | 25 |
| Consumers Pwr. | 2,734 | 2,684 | 2,975 | 3,185 | 3,409 | 3,684 | .... |
| Dairyland Pwr. | 224 | 260 | 300 | 345 | 400 | 460 | 530 |
| Wis.-Mich. Pwr. | 59 | 52 | 46 | 46 | 46 | 46 | 46 |
| Madison G. & E. | 188 | 191 | 207 | 221 | 213 | 226 | 239 |
| Manitowoc Mun. | 63 | 67 | 70 | 73 | 77 | 80 | .... |
| Wisconsin P. & L. | 478 | 490 | 544 | 606 | 654 | 701 | 758 |
| Wisconsin Pub. Serv. | 460 | 489 | 531 | 571 | 612 | 663 | 713 |
| Cent. Illinois Lt. | 660 | 640 | 700 | 750 | 800 | 850 | 900 |
| Pub. Serv. of Ind. | 2,238 | 2,214 | 2,167 | 2,266 | 2,404 | 2,551 | 2,692 |
| Cincinnati G. & E. | 1,748 | 1,737 | 1,774 | 1,837 | 1,976 | 2,126 | 2,273 |
| Col. & So. Ohio Elec. | 986 | 1,022 | 1,064 | 1,101 | 1,134 | 1,168 | 1,203 |
| Painesville (Ohio) Mun. | 28 | 31 | 27 | 29 | 31 | 34 | 37 |
| Dayton P. & L. | 945 | 910 | 975 | 1,043 | 1,113 | .... | .... |
| Toledo Edison | 903 | 900 | 923 | 853 | 910 | 993 | .... |
| Lake Sup. Dist. Pwr. | 86 | 90 | 112 | 124 | 124 | 143 | 150 |
| **SOUTH ATLANTIC** | | | | | | | |
| Potomac Elec. Pwr. | 1,306 | 1,293 | 1,319 | 1,355 | 1,393 | 1,437 | 1,487 |
| Duke Pwr. | 3,165 | 3,350 | 3,380 | 3,603 | 3,829 | 4,074 | .... |
| Georgia Pwr. | .... | 468 | 1,308 | .... | .... | .... | .... |
| Gulf Pwr. | .... | 100 | 105 | .... | .... | .... | .... |
| Monongahela Pwr. | 1,516 | 1,594 | 1,523 | 1,602 | 1,663 | 1,700 | 1,700 |
| Eastern Shore Pub. Serv. | 255 | 274 | 251 | 267 | 281 | 300 | 380 |
| Carolina P. & L. | 800 | 900 | 1,000 | 1,100 | 1,200 | 1,200 | 1,200 |
| American G. & E. | .... | 8,400 | 9,068 | .... | .... | .... | .... |
| Delaware P. & L. | 380 | 318 | 360 | 387 | 420 | 420 | 420 |
| Virginia E. & P. | 1,925 | 2,100 | 2,100 | 2,100 | .... | .... | .... |
| **WEST NORTH CENTRAL** | | | | | | | |
| Kansas City P. & L. | 1,028 | 1,101 | 1,048 | 1,108 | 1,226 | 1,330 | 1,442 |
| Nebraska P. P. S. | 85 | 40 | 80 | 80 | 80 | 120 | 160 |
| Otter Tail Pwr. | 524 | 508 | 508 | 376 | 376 | 420 | 465 |
| Chillicothe (Mo.) Mun. | 31 | 32 | 35 | 37 | 39 | 42 | 45 |
| Ames (Iowa) Mun. | 17 | 16 | 18 | 20 | 20 | 22 | 25 |
| Iowa Southern | 183 | 218 | 231 | 244 | 269 | 285 | 302 |
| Interstate Pwr. | 205 | 215 | 237 | 250 | 270 | 275 | 290 |
| Corn Belt Coop. | 33 | 25 | 31 | 36 | 41 | 45 | 48 |
| Union Elec. & Subs. | 3,130 | 2,706 | 2,419 | 2,450 | 2,738 | 2,860 | 3,057 |
| Black Hills P. & L. | 176 | 188 | 260 | 275 | 300 | 310 | 320 |
| Northwestern Pub. Serv. | 205 | 200 | 150 | .... | .... | .... | .... |
| **EAST SOUTH CENTRAL** | | | | | | | |
| Louisville G. & E. | 965 | 1,080 | 1,135 | 1,190 | 1,250 | 1,312 | 1,375 |
| Alabama Pwr. | 1,209 | 1,590 | 1,725 | 2,360 | 2,575 | .... | .... |
| **MOUNTAIN** | | | | | | | |
| Pub. Serv. of Colo. | 281 | 292 | 409 | 450 | 500 | 560 | 630 |
| So. Colo. Pwr. | 42 | 62 | 65 | 110 | 110 | 110 | .... |
| Projected U. S. Total | 115,897 | 117,000 | 129,400 | 144,400 | 153,200 | 160,100 | 167,700 |

NOTE: In some instances, figures were not supplied for some years.

**TOP CUTTING** and shearing of Pittsburgh seam is assigned to universal cutting machines with 9-ft bars at the Williams mine of the Consolidation Coal Co. (W. Va.). Top coal is left to help support roof.

# Well-Maintained Equipment Gets High Output at Williams

**BIG SHUTTLE CARS** are teamed with 10-ton all-steel mine cars for effective transportation from face to slope.

**ROTARY DUMP** has 450-tph capacity. Operator can communicate with cleaning plant, dispatcher and section.

**HIGH-CAPACITY** loading equipment averages 500 tons of clean coal per shift in single-unit sections and 1,000 tons where double crews are employed. Equipment delays are kept to a minimum by a preventive maintenance program.

# Williams Mine Hits Stride

**Combining modern equipment and effective mining methods, Consol of W. Va. expands mine output to 6,000 tpd with only 305 men on the payroll. Double crews, thorough maintenance and high-capacity loop haulage contribute to gains.**

By A. E. FLOWERS
Associate Editor, COAL AGE

EXPANDING from a property which produced only 400 tons of raw coal per day when it was purchased by Consolidation Coal Co. (W. Va.) in 1943, Williams mine currently is producing 6,000 tons of clean coal per day. Consol's primary purpose in purchasing the mine was to develop it to supply 2,000 tpd of fuel to the Western Maryland R. R. But as diesels replaced steam locomotives, this market declined and new ones were sought. Growth of the mine to its present capacity has been made possible primarily by addition of the cleaning facilities which prepare a uniform-quality utility and industrial coal. Preparation at the three-shift operation is handled in the new Williams cleaning plant which can be expanded to wash 15,000 tpd when required (*Coal Age*, July 1953, p. 92).

With what is reported to be the largest production potential and largest reserves of any Pittsburgh-seam operation in northern West Virginia, Williams mine has constantly moved forward in output and application of modern methods. Key dates in the expansion and modernization program are as follows:

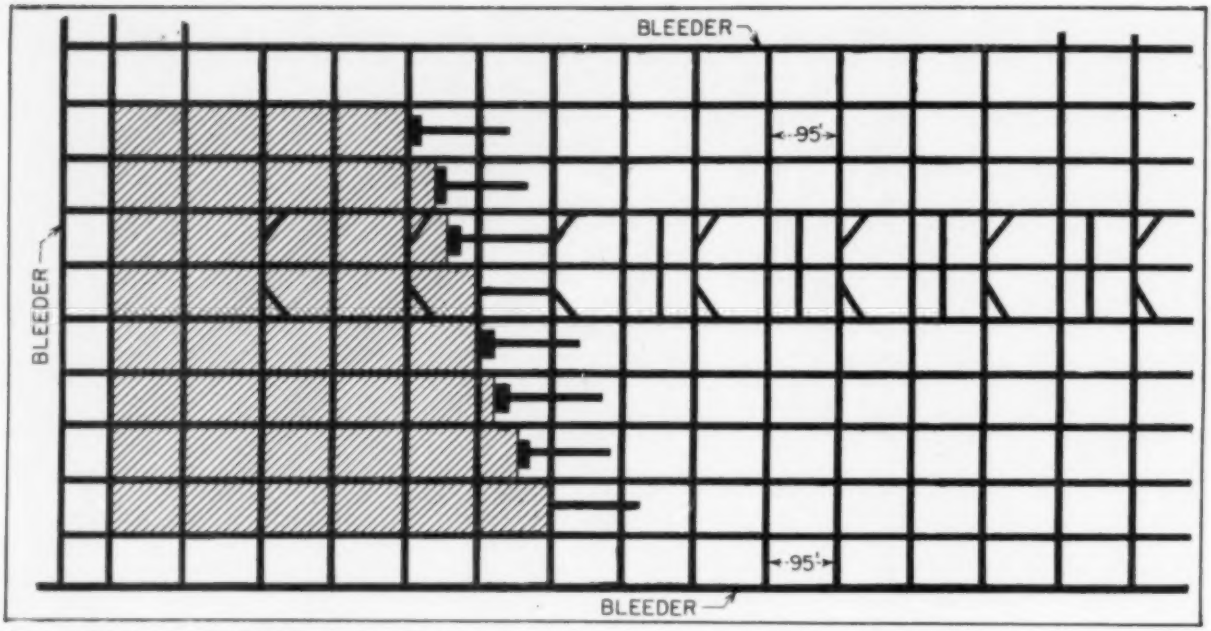
**1947**—Slope driven and surface facilities improved to increase output to 2,000 tpd.

**1951**—Work started on new cleaning plant for washing all sizes and heat-drying fines. Roof-bolting introduced underground, resulting in a 25% increase in output per unit. Working areas concentrated by using double units in one section, upping output per man-day. Mine layout changed to permit maximum efficiency from double unit. Handheld hydraulic coal drills added to permit cutting crews to handle drilling.

**1952**—More mine cars added and loaded-car storage area at slope bottom increased to insure continuity of production in event of down time at the preparation plant. Electric switch-throws installed to speed haulage.

As a result of this continuing program of improvement, production from double-unit sections is as high as 1,000 tons of clean coal per shift while output from single-unit crews averages 500 tons. Effective use of manpower in all phases of the operation permits Williams mine to maintain its output with only 305 men.

Management of Consol of W. Va. is headed by George Higinbotham, president, with headquarters in Fairmont. Other members of the management team include G. L. Judy, vice




**HOW COMPLETE EXTRACTION** of pillars is planned at Williams mine. Blocks will be split on retreat and remaining portions recovered as final step. Bleeders will be protected by row of blocks.

# Mine Design Permits Efficient Use of Equipment

**HYDRAULIC DRILLING** by cutting crew is handled efficiently with lightweight handheld unit powered from cutter.

**ROOF SUPPORT** is by 4- and 5-ft expansion-type bolts installed on 5-ft centers with hydraulic rotary unit.

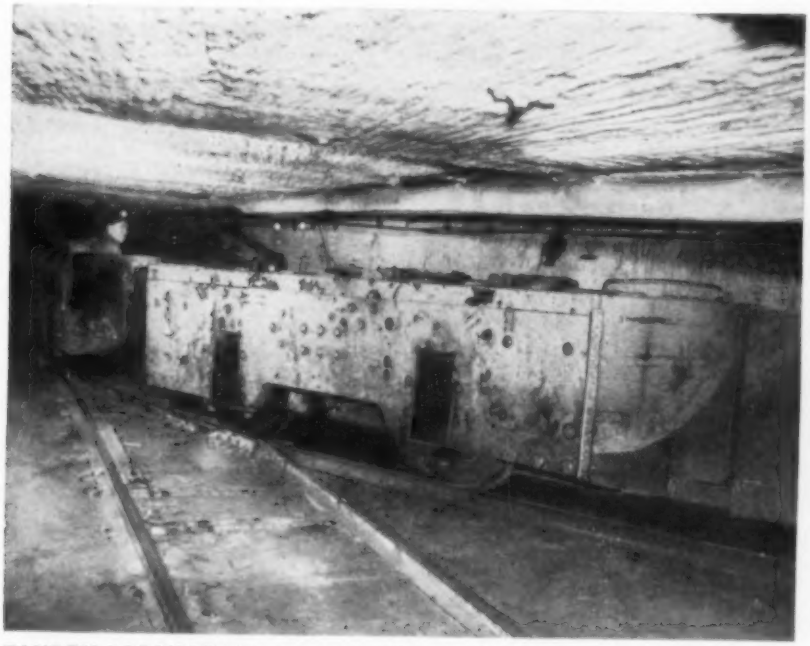
president; O. C. Ankrom, chief engineer; W. D. Steele, preparation manager; A. A. Ash, purchasing agent; G. Henderson, maintenance superintendent and J. W. Murry, construction engineer. Operations at Williams mine are directed by John Kebblish, superintendent. Assisting him are O. F. Allen, mine foreman; A. L. Haines, maintenance foreman; D. R. Stewart, preparation engineer; and Reger Vernon, mining engineer.

## WHAT MINING CONDITIONS ARE

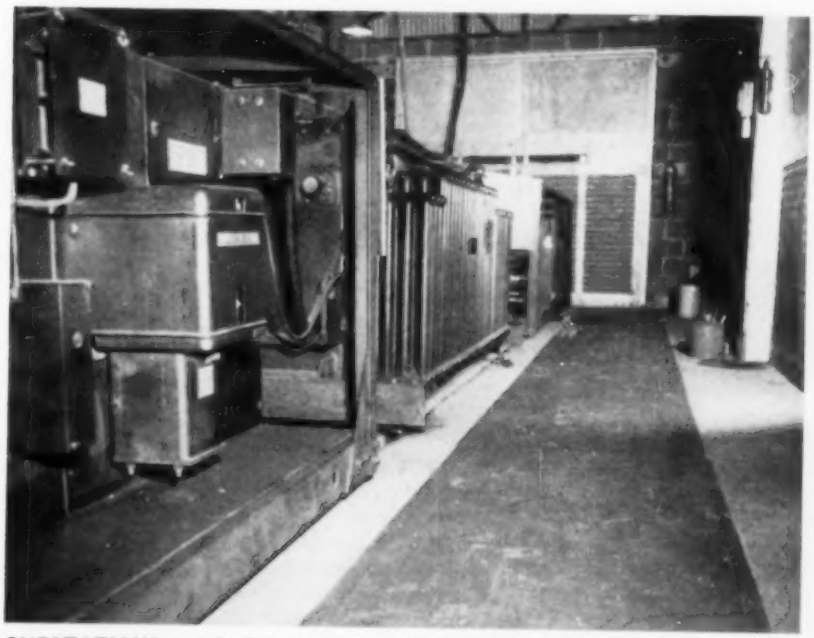
The Pittsburgh seam lies 70 ft below the surface at the portal of the combined man and belt slope and cover ranges up to 500 ft under the surrounding hills. Average thickness of the coal is 7 ft but 10 in of top coal is left to help support the 12 to 18 ft of friable shale above. Dipping to the northeast slightly over 1%, the coal contains clay veins of varying thickness and numerous sulphur balls. Active mining areas are dry, although pumps are required to handle inflow from nearby abandoned areas and from the area immediately under Bingamon Creek.

## HOW THE MINE IS DESIGNED

When double loading units are assigned to a section, main entries are developed with 10 headings, all on 45-ft centers except Nos. 6 and 7, which are on 80-ft spacing. Break-



**TANDEM LOCOMOTIVE** keeps coal rolling to the slope bottom in 30-car trips. Two units handle the haulage job in well coordinated loop-haulage system.



**SUBSTATIONS** supply DC power to mine through boreholes adjacent to fireproof surface buildings. Units are moved every 5,000 ft of advance.

throughs are projected on 80-ft centers and are 90 deg with the headings except at loading points, where they are angled to permit installation of loop-track haulage. When a single loading unit develops mains, nine headings are driven. An emergency escapeway is maintained in one heading and is separated from both main return and intake air by masonry stoppings.

As the mains are developed, panel entries are necked by driving five headings to a depth of 180 ft. Thus when mining equipment is moved into the panel there will be ample territory for it to operate effectively while expanding the entry to mine headings.

Complete extraction of pillars is planned in all panel entries, with bleeders left on both sides of the panels. Details of the proposed pillar extraction method is shown in an accompanying sketch. Depth of pillar panels will be varied to fit property lines but will be held to a maximum of 2,000 ft.

## MINING THE COAL

Coal is top cut and sheared on the right rib by Joy 10-RU universal cutters equipped with Cincinnati chains and Carboloy bits. Each crew cuts and shears an average of 15 places per shift and also handles the coal-drilling assignment. Three holes are drilled per cut with a hand held Schroeder hydraulic drill equipped with Carboloy bits. The middle hole is charged with six sticks of du Pont Monobel AA powder and the others with five sticks each. Holes are fired singly.

Loading is assigned to Joy 11-BU loaders and transportation from the face to loading ramps is handled by 10-SC shuttle cars. Shuttle cars discharge directly into 10-ton U. S. Steel and Differential solid-body mine cars which are spotted at the loading point by a Brown-Fayro hoist. Mine cars are fed to the loading point from a loop-track system that permits uninterrupted loading.

Single-unit section crews are made up of the following: 1 loader operator; 1 loader helper; 2 cutters and drillers; 2 bolters; 2 shuttle-car operators; 1 loading-point man; 1 shotfirer; 1 utility man; and 1 foreman. Supplementing the 12-man crew on the day shift are a bratticeman and a pipeman who keep up brattices and pipe lines for all three shifts.

Double-unit section crews consist of the following: 2 loader operators; 2 loader helpers; 4 shuttle-car operators; 4 roof-bolters; 4 cutters and drillers; 1 shotfirer; 1 loading-point man and 1 foreman. A bratticeman and a pipeman also are used on the day shift with the standard 19-man crew.

Roof is supported by 4- and 5-ft Bethlehem expansion-type roof bolts, equipped with bale-type shells and 6x6x¼-in formed plates. Six bolts on 4½-ft centers are installed per cut of coal and two-man bolting crews set an average of 100 bolts per shift. Installing sufficient bolts to keep ahead of the loading machine never has been a problem at Williams mine. Bolting equipment consists of Fletcher, converted Baker-Raulang units and a company-built machine made up of Baker bolting drills mounted on an 7-BU chassis.

Considerable savings are being achieved by recovering roof bolts from areas in which complete pillar extraction was not practiced. The recovery job is assigned to a special three-man crew that loosens the bolts

**REPAIR HEADQUARTERS** are underground in maintenance foreman's office where complete records are kept.

**ELECTRONIC-EQUIPMENT REPAIR** is centered in special room where instruments are available for testing units.

# Effective Maintenance Keeps Equipment Producing

**REGULAR REPAIR** keeps cars in top condition. One or more are inspected, greased, repaired and painted each day.

**MONORAIL** permits easy transfer of heavy parts or unit assemblies from mine cars to underground supply house.

with wrenches. Salvaged bolts are piled in a wheelbarrow and hauled to the track heading where new expansion shells are put on. Bolts are then stacked at a central point for later delivery to active areas.

## HAULING THE COAL

The Williams 42-in track-haulage system is designed to get maximum efficiency from transportation equipment by combining high-speed haulage with good trip control. Main roadways are laid with 85-lb welded rail on 6x8-in creosoted ties and are ballasted with crushed limestone. Maximum grade against the loads is 1.2%.

Temporary track is laid in a loop system with 60-lb rail on steel ties as development progresses. Loops are installed on 240-ft centers and two loops and enough additional track to hold 30 empties always are maintained in the temporary track.

To speed trip changes, the brakeman communicates with the dispatcher by telephone and his message is then relayed to the motorman via trolley phone.

On all haulways expected to have 8 yr or more life, additional roof support is provided before grading is started. Steel channels, 12 ft long, are installed on 4½-ft centers with four 6-ft wedge-type roof bolts.

All trips are handled by a pair of Goodman tandem locomotives, each made up of two 15-ton units. A Jeffrey tandem made up of two 20-ton units serves as a spare. A maximum of 30 cars is handled each trip.

In addition to providing a well-graded solid roadbed for haulage equipment, Williams mine has Cheatham electric throws for all switches, including power-on power-off selector switches where selection is desired. Selector switches are controlled by the quantity of current flowing through a short section of trolley wire to which the switch controls are connected. If power is flowing through the locomotive controller, the switch is positioned for the straight track. But if there is no current flowing through the motor controller as the collector shoe passes over the short section of trolley wire in the switch circuit, it is thrown for the curve.

Another unusual feature of the haulage system that has improved haulage efficiency is installation of electrically controlled frogs in the trolley wire at junctions in the main haulage. The wire switches provide a smooth path for the collector shoe at the junction of the curved and straight wires and permits the motorman to take the curve at full speed without fear of the pole leaving the wire.

Control of haulage units is centered in the dispatcher's office near the foot of the slope. Williams' main haulage is divided into five blocks controlled by a Nachod electric signal system. Signals at each block along the haulway are connected to light-indicator panel in the dispatcher's office. As a locomotive enters one of the blocks, a red light corresponding to the block number flashes and remains on until the motor passes to the next block. Thus the dispatcher can follow the motor about the mine.

To permit communication between all motormen, dispatcher and personnel traveling in Lee-Norse jeeps, Femco trolley phones are installed on all locomotives, jeeps, in the dispatcher's office and at the rotary car dump.

To eliminate the use of electric cap lamps as a signaling device when empties are spotted at the loading point, the brakeman talks to the dispatcher by telephone. This message is then relayed to the motorman over the trolley-phone. Management reports that car spotting has been speeded considerably and also is safer since this method was adopted.

### MAINTAINING THE EQUIPMENT

Spotting potential trouble and repairing it before there is an outage is the foundation of the maintenance program at Williams. The center of activity is a well-equipped underground shop where facilities are available for all jobs except machine-shop and armature work, which are sent to Consol's central shop for the W. Va. division.

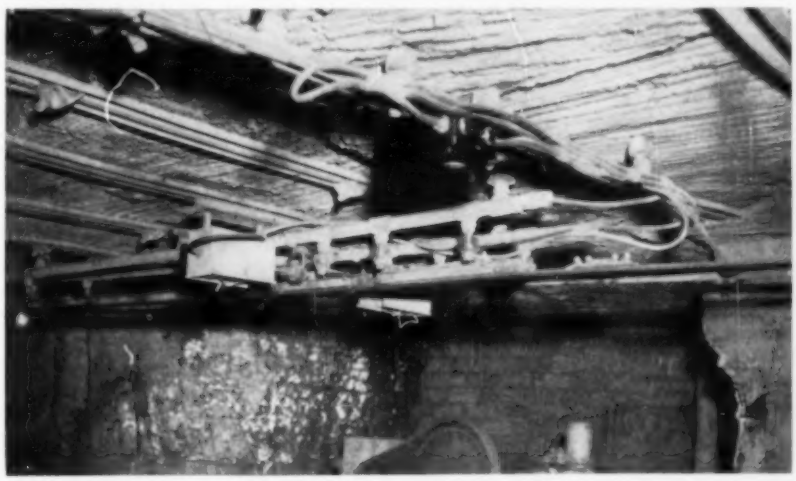
All maintenance men normally work in the central underground shop and are dispatched to the section only in event of a breakdown. Three mine jeeps are available to speed mechanics and materials to equipment that needs emergency repairs on the section.

Regular systematic inspection is the keynote in keeping equipment running at Williams. All equipment is checked on each section at least twice each month to detect electrical weaknesses and excessive wear or looseness in mechanieal parts. Any

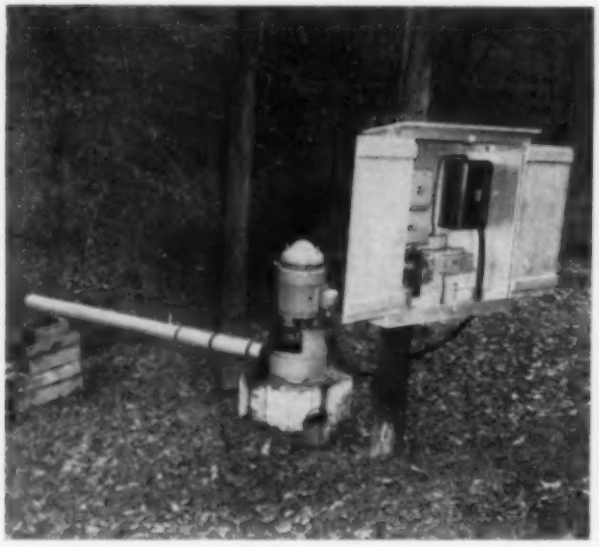
**TRANSPORTATION CONTROL** is centered in underground dispatcher's office equipped with indicator lights, telephone and trolley phone.

## Track Haulage Well Coordinated

**STEEL LINING** supports roof throughout section of main haulage that passes under Bingamon Creek. Circular-shaped sections are bolted together.



**ELECTRICALLY CONTROLLED SWITCH** in trolley wire permits locomotive pole to take curve smoothly. Unit is interlocked with electric track switch.



**TURBINE PUMPS** handle mine water with a minimum of attention. Time-clock controlled units are inspected weekly.

**"SKI TOW"** eases walk up slope. Moving cable is set in motion from push-button controls at either end of slope.

## Special Tools and Services Improve Efficiency


**FIRE-FIGHTING EQUIPMENT** consisting of tool and brattice car, two track-mounted and two off-track fire extinguishers is ready for emergency service.

**INSTALLING SPADS** is speeded with lightweight handheld tool.

parts showing signs of possible failure are replaced to prevent a breakdown during the work shift.

To keep the mine cars in top operating condition, a continuous program of car repair is carried out in a special underground inspection and repair station. Each day one or more cars are brought to the station for inspection, repair, greasing and repainting. Working in a well-lighted area where damage can be spotted easily and where facilities are available to make necessary repairs, one man handles any welding or straightening necessary, in addition to greasing and painting.

To maintain electrical trouble in shuttle cars at a minimum, controller panels are replaced every 8 mo with rebuilt units. As nearly as possible, loaders and cutters are put through the shop every 6 mo for a checkup and major repairs and are completely rebuilt every 1½ yr. Shuttle cars are completely rebuilt every 4 yr.

A card file is kept underground for all major rebuild jobs and for any special work or item on which information is desired. Thus maintenance costs on any particular machine can be computed readily. A complete file of parts books, manufacturers' catalogs and electrical and mechanical drawings for equipment at the mine also is kept in the maintenance foreman's office. All mechanics have access to the file and are encouraged to use it.

Included in the maintenance facilities is an underground electronics shop where an electronics specialist services 12 trolley phones, 36 telephones, and maintains the Nachod block signal system and electric selector switches. Instruments used in the electronics shop include a Simpson multimeter, Precise vacuum tube voltmeter and Jackson tube tester. One man handles all the work on the day shift.

### VENTILATING THE MINE

Air for ventilating the mine is supplied by three fans, each of which

**UNDERGROUND CONFERENCE** includes O. F. Allen, (left) mine foreman; R. Varner, engineer; P. Hay, section foreman; and C. N. Holbert, engineer.

**DISCUSSING** mining problems in foreman's office are H. Myers (left), section foreman; O. F. Allen, mine foreman; and J. Kebblish, superintendent.

circulates air through a separate area. A 7-ft Jeffery Aerodyne unit delivers 150,000 cfm at a 2.4-in water gage to part of the No. 1 North area and all of the Main North territory. A 6-ft Joy fan delivers 90,000 cfm at a 1.8 water gage to the Main South section, and a second 6-ft Joy unit, installed at the old Hutchinson mine, exhausts 90,000 cfm while ventilating part of the No. 1 North area.

## POWERING MINE EQUIPMENT

All DC power is delivered underground through boreholes adjacent to surface rectifiers housed in concrete-block buildings or prefabricated structures. The conversion job is handled by six rectifiers made up of two General Electric 400-kw units and one 300–, two 400– and one 500–kw Westinghouse units. As mine headings advance, substations are moved to new locations at 5,000-ft intervals. The power circuit linking each substation to the underground is made up of two 1,000,000-cir mil insulated copper feeders and two 1,000,000-cir mil returns. Leading from the boreholes and along the mains are 1,000,000-cir mil positive and negative conductors. The rails of the main haulage system also are connected to the return side of the circuit. To keep power losses at a minimum and provide good voltage at the face an additional 500,000-cir mil feeder is installed in the empty-track heading. All feeder lines are installed in a catenary system with Ohio Brass hangers. Overload protection is provided by ITE automatic circuit breakers installed at 2,000-ft intervals along haulways and near each section.

A 4,000-ft section of 1,600,000-cir mil aluminum feeder cable was installed experimentally along the main haulage. Management reports that the aluminum is cheaper than copper for equivalent current-carrying capacity but is less abrasion-resistant and therefore must be handled more carefully than copper cable. Another minor inconvenience cited is that the aluminum feeder must be painted with Penetrox every place it comes in contact with hangers to prevent electrolysis.

## PUMPING WATER

No permanent pumps are required in the active working areas and if water is encountered at the face, it usually is in small quantities which can be disposed of by pumping into coal cars. Inflow from abandoned areas and along the portion of the main haulage under Bingamon Creek is handled by Cook and Worthington turbine pumps located on the surface over boreholes that tap low points in the mine. All turbine units are time-controlled and require only weekly inspection.

## SUPPLYING THE MINE

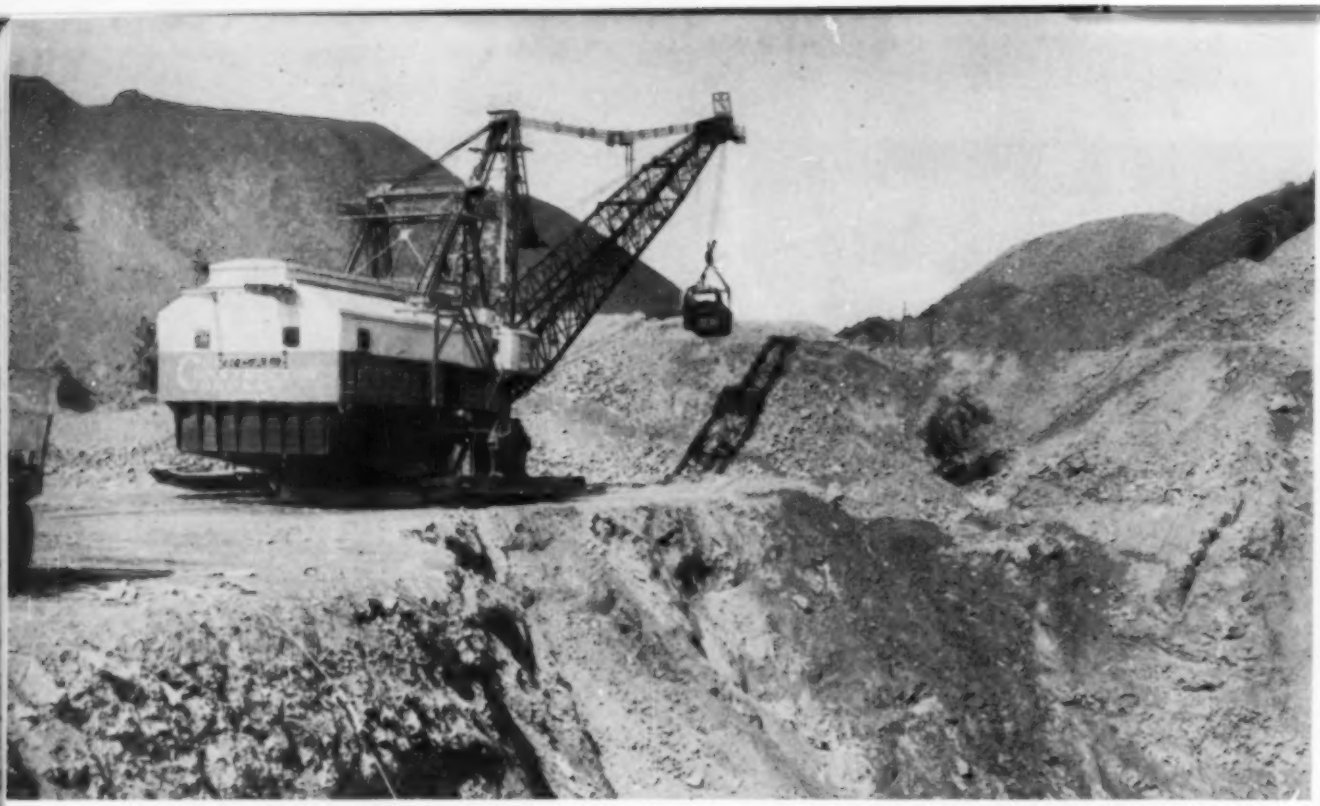
Explosives, lubricants and construction materials are loaded into special supply cars on the day shift by a four-man crew that also lowers them to the foot of the slope. An underground supply crew delivers the construction materials on the day shift and also moves machinery to and from the underground shop. Roof bolts are delivered on all shifts by the haulage crews, while oil and powder are delivered on the afternoon shift. Shop materials are loaded in a special car for lowering on the day shift.

## CO-OPERATING FOR SAFETY

The Williams safety program is designed to maintain enthusiasm at a high level among all employees by encouraging them to participate in the program. Once each month supervisors meet with company inspectors and the safety director to discuss all lost-time accidents at Williams and also some of the accidents that occurred at other Consol mines. After classifying the accidents according to causes, they are discussed and methods of preventing a recurrence or a similar one are developed.

Another method designed to keep enthusiasm high was organization of a chapter of the Joseph A. Holmes Safety Association at the mine. Monthly meetings are held at the UMWA hall to discuss all accidents that occurred during the previous month, and one company safety rule is read and discussed. From time to time, one of the employees gives a talk on the hazards involved in his job and what he does to prevent accidents. A short movie on safety is shown on alternate meetings.

All supervisors have taken the U. S. Bureau of Mines course in accident prevention. And all haulagemen and cutting-machine operators took a special course sponsored by the W. Va. Department of Mines pertaining to their particular jobs. Three first-aid teams are sponsored and a mine-rescue team and fully equipped rescue station are available for emergency service.



**WALKING DRAGLINE** with 25-cu yd bucket strips 9,000 cu yd of blasted rock or 17,000 cu yd of wash in 21-hr day up to 120-ft highwall in recovering anthracite in previously stripped areas. Down time is only about 8% of available working time.

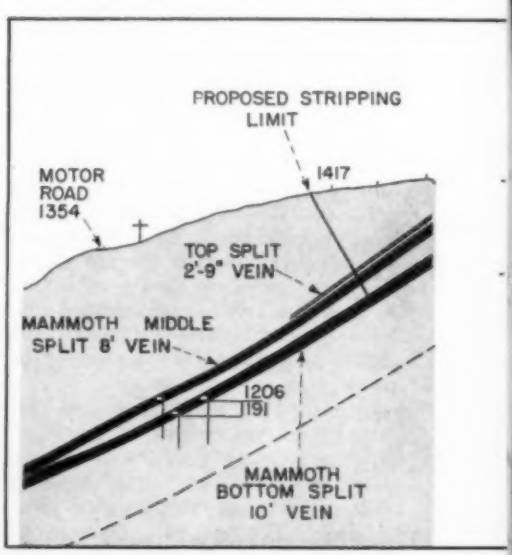
# Big Drills Pace Big Draglines

**Reduced labor requirements, wider hole spacing and better placement of explosive charges in holes are advantages of rotary overburden drills producing 12¼-in blastholes in anthracite stripping.**

By HAROLD DAVIS
Associate Editor, COAL AGE

MORE EFFICIENT OVERBURDEN DRILLING followed by stripping with high-capacity draglines is making it possible for Correale Con-

**ROTARY DRILLS** each produce an average of 129 ft of 12¼-in blasthole in 7-hr shift. This unit is drilling in rock interval between splits of Mammoth vein, having already exposed upper split which has been loaded out.




**MORE EFFICIENT DRILLING** and high-capacity stripping unit extend the practicable stripping limits in areas

struction Co., Hazelton, Pa., to rework strip areas in the southern anthracite field far beyond the economic limits of previous operations. The company recently purchased two Bucyrus-Erie 50-R rotary overyburden drills (*Coal Age*, March, 1953, p. 80), one now in use at Repplier mine near Minersville, Pa., and the other at Locust Summit, Pa. Both operations are worked by the Correale organization for the Philadelphia & Reading Coal & Iron Co., Pottsville, Pa.

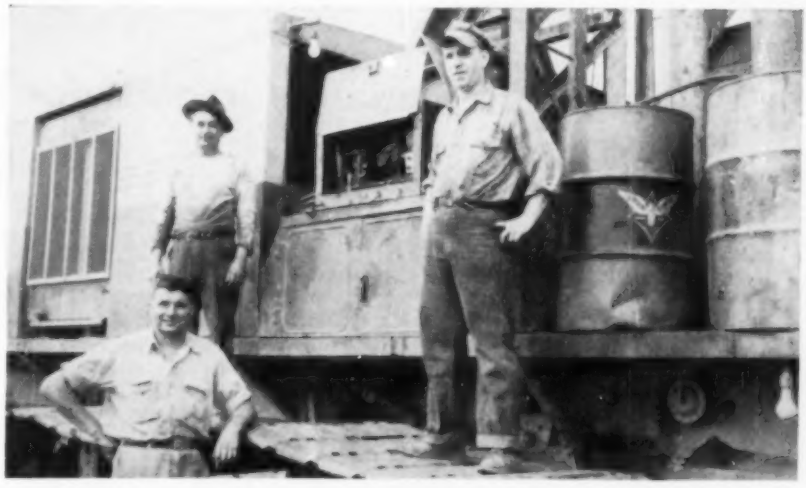
## INCREASING DRILLING EFFICIENCY

In typical Mammoth-vein overburden, the new drills are sinking an average of 129 ft per shift (7 hr) of 12¼-in blasthole, which is a considerable gain over the 39 ft per shift of 9-in hole drilled by each of the churn drills formerly used. Furthermore, six men using the 50-R on a 3-shift basis now do the work formerly done by 25 men. The latter figure includes the crews on the churn drills, three men per shift at the bit-dressing shop and one man per shift to pick up and deliver bits at the job and shop.

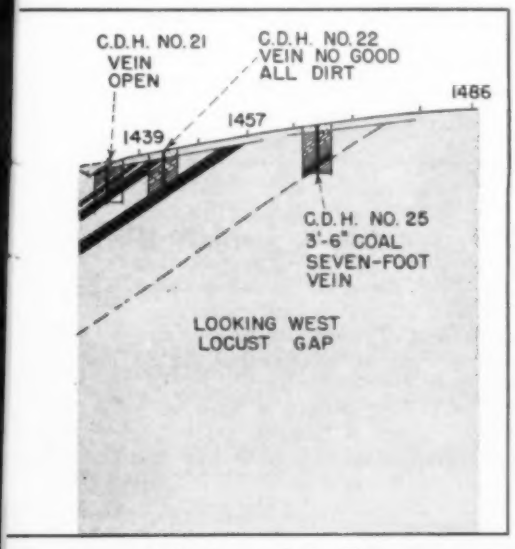
A typical section of the Mammoth-vein overburden includes 60% hard sandstone, 25% medium-hard rock, 10% broken rock and 5% coal, slate and fill. The holes average about 85 ft in depth, and the Hughes Aero and Aerojet bits are showing an average life of 1,803 ft of hole before reductions in gage and cutting ability prohibit their further use.

The blasts are prepared and detonated by specialists employed by the explosives manufacturers who serve the operations. The blasting ratios are

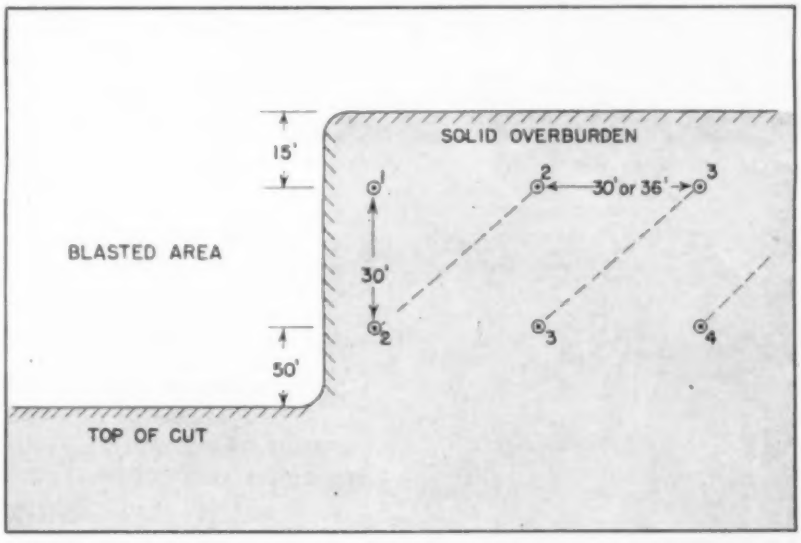
**REPPLIER LOADING**—2½-cu yd loading shovel removes final coal from a Holmes-vein cut and loads into 22-ton trucks.



**WATER PUMP**, in the open cabinet on the drill, injects stream of water into drilling stem to trap fine dusts within the air-removed cuttings. Fine dusts were drawn into rotating electrical units, and caused trouble.




previously worked. The new equipment makes possible the recovery of additional 120-ft lifts.




**WIDER HOLE SPACING** is one of the beneficial results of drilling 12¼-in blastholes. Also, explosive forces can be better concentrated near point of heaviest burden.

**1 TURNING TAIL** to its direction of travel, the dragline moves always backward at a rate of 0.18 mph. In this view shoes are moving toward the rear for a new step.

**2 WITH FEET ON THE GROUND,** body of machine is raised and carried back to new resting place for next step. A truck hauls trailing cable in short moves.

# Positioning a large dragline for better operation . . .

**DRAGLINE** spoils blasted overburden at Locust Summit to permit 8-cu yd loading shovel to reach coal for loading into 18-ton trucks.

0.90 lb per cubic yard of Repplier and 0.85 lb per cubic yard at Locust Summit to achieve the degree of fragmentation required for best performance from the 25-cu yd Bucyrus-Erie 1150-B draglines.

Each of the two jobs is equipped with one of the 1150-B's, each removing and spoiling about 9,000 cu yd per day (21 hr) of blasted rock or 17,000 cu yd per day of wash material or recast. At the Minersville operation, where coal is produced for the Oak Hill colliery of P&R, daily production is about 2,200 tons for 69 employees, including supervisors and 10 men at the rough-cleaning plant, five on each of the two operating shifts.

The ratio of overburden to coal, in place, is 7½ to 1, although this does not include some recasting which must be done as lower lifts of the pitching veins are recovered.

## STRIPPING OVERBURDEN WITH 25-CU YD DRAGLINES

The contract at Repplier includes the recovery of the Holmes vein, the three splits of the Mammoth vein and the Mammoth vein in a back basin tributary to the main basin. At Locust Summit the three splits of the Mammoth vein are being recovered.

Working depth below the draglines is limited to 120 ft to maintain the excavating efficiency of the units. The machines construct their own benches at this level and it is this phase of the work which necessitates some recasting of spoil from the previous cut.

Generally, the dragline and loading unit are engaged in recovering one vein while the overburden drill operates in the rock interval between this actively worked vein and the next lower one. In such instances, the drill already has completed its work in the overburden cut being removed, thus the interval between drilling and stripping is wide enough to eliminate any possible interference between these operations.

So far, the drill has demonstrated that it can "run away" from the stripping unit on a straightaway cut, but its greater value lies in the fact that it provides high-capacity drilling on short notice to serve the big dragline. This is important in recovering separated pockets of coal or in recovering coal from the ends of basins where the need is for fast drilling and early retirement of the drill from the area to provide complete freedom for the dragline.

The drilling pattern in hard sandstone consists of holes on 30-ft centers, and in medium-hard rock the spacing is 30x36 ft (holes 36 ft apart in rows parallel to the highwall, with rows 30 ft apart). Average length of hole is 85 ft, as mentioned, but as a matter of fact the holes in the downdip row are about 100 ft deep while

**3 FEET ARE UP** and moving backward for next step. Overhanging weight of boom and bucket are supported by trailing edge of tub which maintains ground contact.

**4 IN LONGER MOVES,** trailing cable is looped around pipe spindle on this steel sled at 200-ft intervals to reduce strains in cable. A bulldozer hauls the sled.

those in the up-pitch row are shorter than average. The longer holes accommodate about 3,500 lb of explosives in 11-in cartridges or cans. The top 30 ft in each hole is filled with stemming provided by the drill cuttings.

Charges are primed with Primacord with ms connectors inserted in multiple shooting. As shown in the diagram, pairs of holes are detonated simultaneously, according to the sequence numbers at the holes.

## SUPPRESSING FINE DUST WITH WATER-INJECTION PUMP

An innovation developed by Correale officials and Bucyrus-Erie engineers prescribes the injection of a stream of water into the drill stem at a pressure slightly above that of the air stream in the stem. This jet of water is atomized in the air stream, and has proved effective in trapping the extremely fine dusts within the coarser cuttings precipitated at the collars of the holes by the dust-collecting equipment on the drills. The system consumes about 2 bbl of water per day.

This modification is an outcome of the concern of Correale officials over the fact that fine, abrasive dust could be drawn into the rotating electrical equipment on the drill itself and on the other units in the vicinity. Dust surveys show a marked reduction in the amount of such dusts in the atmosphere since the water-injection system has been in use.

An improvement also has been noted in drilling through broken or crushed strata with the 50-R, which is the case when new holes must be drilled close to the previous shot. Under these conditions, the drill operators in going through broken rock merely back off the bit about 4 ft periodically to let broken material fall back into the hole, then drill down through the broken material at the bottom of the hole with the air stream removing the pulverized material. In churn drilling, this broken ground meant slow, troublesome drilling.

In addition to permitting wider spacing between blastholes, the larger 12¼-in bit also permits greater concentration of explosives near the bottom of the hole where the burden is greatest. These characteristics of the new drills also favorably influence the costs of overburden preparation.

Other units at the Repplier operation are a 2½-cu yd Bucyrus-Erie 54-B loading shovel and a 4-cu yd 120-B dragline. A 3-cu yd Marion 40-A dragline is stationed at the stockpile near the rough-cleaning plant to eliminate fluctuations in plant feed. Coal is hauled from the pit to the stockpile in seven 22-ton International 10-wheel trucks.

At Locust Summit, the loading unit is an 8-cu yd Bucyrus-Erie 190-B shovel. A 2½-cu yd Marion 392 shovel is available for spot loading jobs, and the haulage fleet consists of ten 18-ton Sterling trucks.

## POWER AND MAINTENANCE FOR HIGH-CAPACITY UNITS

The drills and excavating units in the pits are electric-powered. Power is furnished by P&R at 66,000 v to the strip-mine substations, where it is stepped down to 4,160 v for the drills and draglines. The 4,160-v power is stepped down to 2,300 v for the shovels. The neutral in the Y-connected secondary is grounded through a 45-ohm resistor, and only Type SHD (shielded) trailing cables are used. Cables for the 1150-B's are made with 4/0 conductors and for the other units with No. 2 conductors.

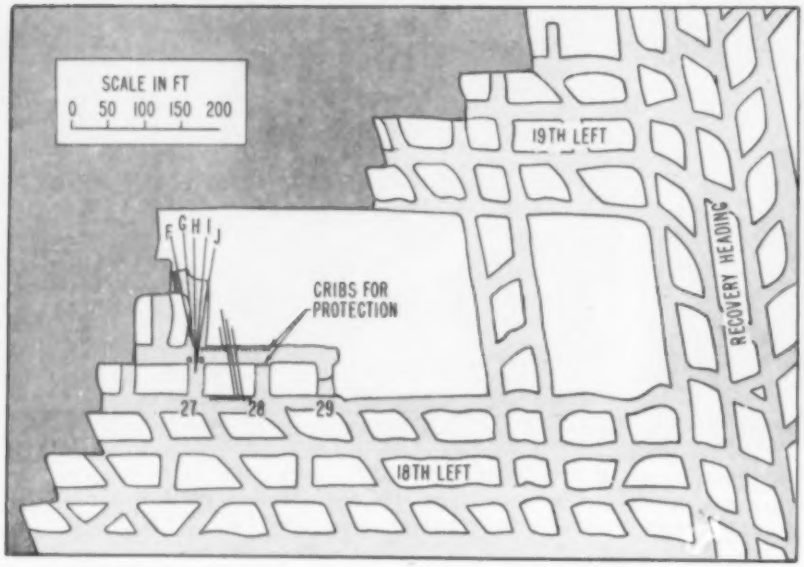
With the success of both operations depending to such a great extent upon the steady operation of the large draglines, all possible steps are taken to keep them operating as much of the available time as possible. Downtime is averaging about 8% of the available working time, which is 3 shifts per day, 6 days a week.

Maintenance crews take over on the seventh day to replace or reverse drag and hoist ropes, replace tub plates or make other scheduled repairs which cannot be done on working days. The 2-in hoist ropes are replaced about every 6 mo and the 2½-in drag ropes about every 3 mo. All wire rope is supplied by Jones & Laughlin Steel Corp. Spot repairs are made during operators' lunch periods since there is no time lapse during shift changes on the stripping units.

Palmer Correale is president of Correale Construction Co.; Irene Correale is vice president; Fred Correale is secretary-treasurer; and R. H. Edgerton is comptroller. The construction company is parent to the Shenandoah Mining Co. and Necho Coal Co.

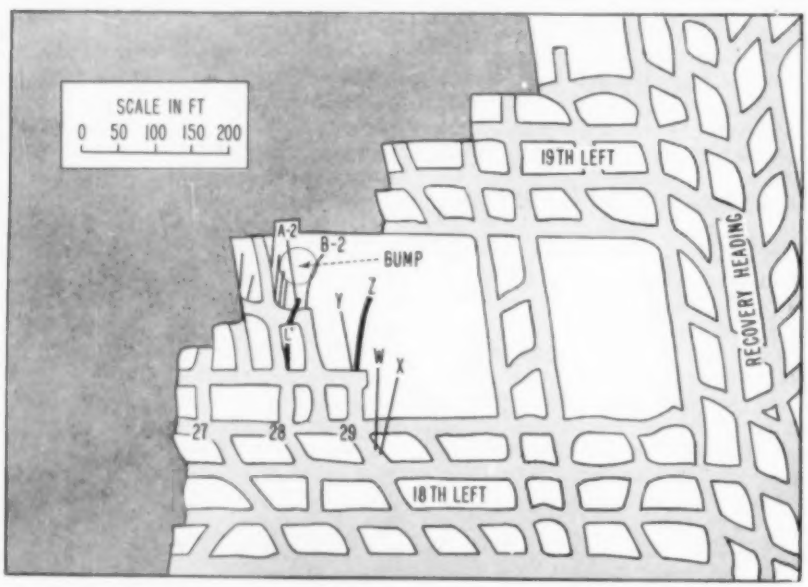
Field operations are in charge of George Seiler, general manager, assisted by Arthur Beecher, chief engineer, and Claude Lawrence, chief electrician. Frank Casey is foreman at Repplier and Louis Perrong is foreman at Locust Summit.

Engineering and operating offices are located at the Repplier job.



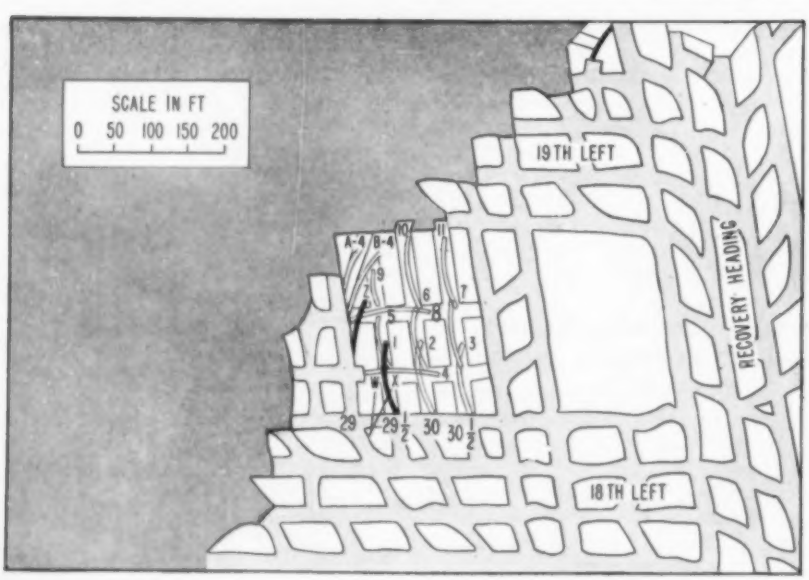

## EARLY DRILLING SCHEME

Fan pattern was dictated by need for protecting drill crew. Hole F, first of series, set off heavy bump at 29 ft, loosening 225 tons of coal. After loading, hole was completed and other four drilled with only light to medium bumps. As noted in other drilling plans shown, drill holes normally are followed in making openings for pillar mining.



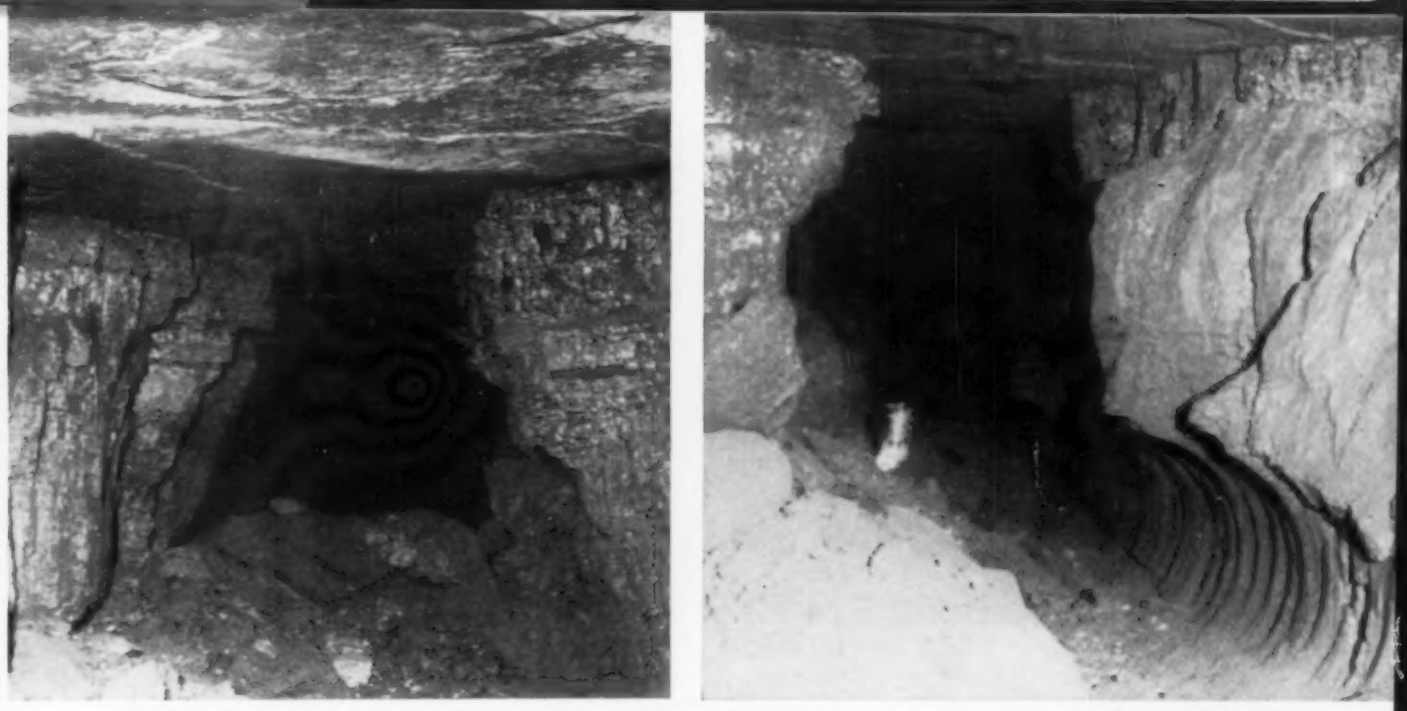

## TRIGGERING BIG BUMP

After drilling Holes W and X in later stage of mining to relieve stress in corner of block, Hole A-2 was started and set off major bump at 57 ft. All cribs and timbers inside barricade were knocked out, face was moved out 8 ft, and crevice in coal was visible for 50 ft.




## DRILLING AND MINING PLAN FOR LARGE VULNERABLE BLOCK

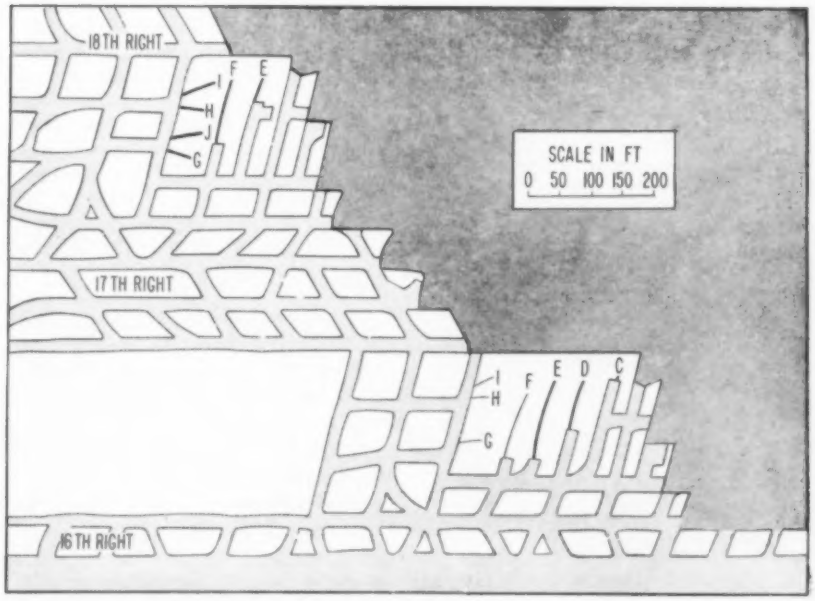
Drilling sequence using 24-in auger is Holes 1, A-4, B-4, 2, 3 and 4, with mining of Rooms 29½, 30 and 30½ to the first breakthrough following. Then Holes 5, 6, 7 and 8 are drilled to permit mining to the next breakthrough, followed by Holes 9, 10 and 11 through to the gob for final development.



**DRILLING RESULTS**—At left is view into first 24-in hole after neighboring hole (right) was completed a distance of 117 ft. At some points along these holes, openings 6 to 7 ft wide were created by bumping off the ribs.

# Auger Drilling To Control Mountain Bumps Pocahontas No. 4 Seam

## Triggering Bumps . . Probing Doubtful Blocks . . . Unloading Stressed Blocks




**PROBING TO CHECK LOADING** on block with 6-in drill. Absence of stress permits continuation of regular development.

By WOODS G. TALMAN
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A MOUNTAIN BUMP is more dreadful than any other major mining hazard. I say this because we have done much about the other hazards of mine operation, but have not made the same progress in preventing mountain bumps.

Certain facts are well known about mountain bumps, as well as certain practices to be avoided and certain precautions to be taken in vulnerable areas. But the uncertainty, the dread and the nervous strain are still present in these areas, as was brought home to me some months ago by this statement by a foreman: "It wasn't as tough on me fighting my tank in Europe as it is wondering if we will have a bump on my section."

I shall not review the record on the

**FACE SETUP** with 6-in core drill. With protective cribbing, machine is 60 ft back from the face.

**TROUGH** conveys cuttings back from the face with small drill. Crushed rib at right reflects heavy burden and removal of coal from two big holes.

**BIG DRILL** set up approximately 24 ft back from face with two or more rows of cribs between it and the face. Elevating conveyor transfers coal to shuttle car.

causes of mountain bumps nor the theories involved. Rather, I shall discuss progress in the Pocahontas No. 4 seam in a direction we consider to be a positive approach to minimizing this hazard.

## AUGERING FOR RELIEF

Since August, 1953, we have been experimenting with unloading the internal stresses in pillars by augering them before mining, with the work evolving into three major activities:

1. Setting off bumps by triggering them with 6-in augers—mainly in point areas known to be loaded.

2. Probing doubtful blocks with 6-in augers to find out if they are loading. Negative results permit continued orderly mining.

3. Gradually unloading large blocks known to be stressed by using 24-in augers, followed by normal block development.

The project has been a joint activity of operations, engineering and safety in the Gary-Lynch Dist.

## THE HAYDUK SYSTEM

One milestone along the road to the present system was first noted, like the present development, at a meeting of the safety representatives of the Raw Materials Div. of the corporation. Talking on the subject of "Coal Mining in Areas Vulnerable to Mountain Bumps," at the 1953 meeting, John L. Schroder, Jr., mining engineer, Gary-Lynch Dist., presented the milestone as follows:

"The mining engineer of the Gary Dist., Martin Hayduk, designed a new system with the main thought of minimizing the frequency and severity of mountain bumps. The system was based on the experience we have gained with operation under modifications of the old system, and recognized the following factors, peculiar to the Pocahontas No. 4 seam, established over a period of many years of pillar extraction in this seam at Gary:

"1. The highly stressed area, which lies within the limits of the convergence effects, moves at approximately the same rate as the retreating pillar line.

"2. There is a decided softening of the periphery of the blocks, which is greatest and deepest on the gob side.

"3. Blocks less than 45 ft in minimum dimension have never been known to bump in the Pocahontas No. 4 seam.

"One of the outstanding features of

this plan is that it incorporates a bare minimum of secondary development outby the rib line."

Thus, in the Hayduk system, solid coal is kept close to the rib line at both extremities, thereby inducing better roof breaks and minimizing the possibility of squeezes. The system worked fine, with, however, certain limitations:

1. When pillar work backed up to an inevitable surrounded block, the system was no longer applicable.

2. "Burnt" bottom and/or unknown factors reduced the system's effectiveness in certain headings.

Earlier, Prof. Charles T. Holland, head, Dept. of Mining Engineering, Virginia Polytechnic Institute, had suggested drilling known loaded blocks and shooting them with massive charges. We did not want to use explosives, but the drilling thought was intriguing.

## AUGERING RESULTS

During a period of study, discussion and more bumps than I like to think about in 1952 and early 1953, we concluded that drilling offered the best chance of success, and that we would go all out in trying it. We started with a Joy 12-B core drill, using shale bits and water through the rods, and resolved that we would not be diverted or discouraged in our search for the answers to three questions:

Q. Could pillars be drilled when it was evident that they were loaded or heavy stressed?

A. Yes.

Q. Could bumps be triggered by drilling into loaded pillars without jeopardizing the safety of the men?

A. Yes. We set off bumps in all intensities from light to those requiring the loading of over 1,000 tons of coal to re-establish the face. Had we not taken the precaution of putting crib and board protection between the rib and the rig, the experiment might have ended the first day. A heavy bump at 25 ft came out the unexpected side of the pillar, knocking out two cribs on each side of the hole. The cribs took the force and saved five people from serious injury or worse.

This experience caused us to go behind a chain pillar, drilling through it into the loaded pillar. This seriously reduced the effectiveness of the rig. Even after adapting it to use 6-in auger sections, the payoff drilling into the loaded block was not sufficient. Experience led to spotting holes opposite breakthroughs, using two rows of cribs 12 ft apart to protect the crew and rig. This method is still in use.

Q. If it were possible to get affirmative answers to the first two questions, using small-diameter holes, could loaded pillars be stress-relieved by large-diameter holes made by underground augers? As a corollary, could this relief be achieved so that the pillars could be mined normally, without reloading and bumping, and also without so much pre-weakening that a general squeeze would be induced?

A. Yes. We have been able to relieve stresses in known loaded pillars, using a 24-in auger (Joy AD-2). We have been able to mine blocks that before we did not dare touch. We did get enough weakening in one area to start a squeeze, but took care of the situation reasonably well by becoming "wagon miners." In other words, we follow the holes, and since the augers always lead to the right in the direction of rotation, we were not able to adhere to the engineered projection precisely. The engineers spot the holes to make sure we are not creating too big a block between holes.

Getting these answers was long, hard and at some times frustrating, but we think it was worth while for these reasons:

1. The men and foremen in our mine feel a whole lot better about their jobs, and that has promoted efficiency.

2. The future of the mine looks a lot brighter.

3. Valuable Pocahontas coal that otherwise would be lost can now be mined.

Summing up, loaded blocks can be augered, bumps can be set off, questionable areas can be probed, and blocks can be pre-weakened and safely mined in the Pocahontas No. 4 seam. With this summation, goes this word of caution:

1. We know only what augering can accomplish in the Pocahontas No. 4 seam in the Gary district.

2. We advise against jumping into this venture without a great deal of planning and preparation.

## FUTURE DEVELOPMENT

For the future, we hope, in the light of our experience, to develop a rig that will have the following features:

1. Mobility and ruggedness.

2. Plenty of power—40 to 50 hp.

3. Ability to reverse instantly.

4. End-on approach instead of side approach in drilling.

5. Built-in mechanism for transferring the coal from the auger to the elevating conveyor.

6. Maximum-possible built-in shielding for the operator.

With these features, we believe drilling will produce about 25 tpm, including a foreman, and thus will not only provide bump control but pay its way with coal.

The names of the individuals who will play leading roles in these further developments cannot, of course, be set down today, but many of them doubtless will be found in the list contributing significantly to results to date:

Karl L. Konnerth, former vice president, Coal Div.

Wm. R. Stedman, general superintendent, Uniontown Dist., who carried the responsibility for the experiment to April 1, 1954.

George H. Sambrook, director, mine inspection, Coal Div., interest and valuable consultation throughout.

Watson Storey, mining engineer, Lynch Dist., increasing water rate behind first bit after determining that cuttings and not weight were fouling the bit.

Austin Cross, mine inspector, and Louis Hicks, assistant mine foreman, Lynch, for getting a hole drilled after an earlier unsuccessful attempt.

Mr. Cross again for the idea of moving behind the chain pillar after the first bump with the drill and, with Lloyd L. Lineberry, district superintendent, Gary, for adapting 6-in auger section to core-drill rig.

Mr. Lineberry; Carl R. Pringle, superintendent; Robert Anderson, assistant superintendent; Perry Mosely, general mine foreman; and Walter Little, general maintenance foreman, perseverance and general enthusiasm in addition to direct contributions.

Martin Hayduk, mining engineer, Gary Dist., studies of mountain bumps, the thin-pillar system, hole projection, correlation of all phases of the job, and consultation.

John L. Schroder Jr., chief engineer; Ben Mills, chief inspector; and John Povlich, mine inspector, consultation, planning and investigation.

Roy Parsons, general assistant mine foreman, for zeal and aptness in overcoming daily problems, valuable advice on hole projection, and care of the crew.

Dwight Baker, James C. Sneed, Cecil Thompson, G. Roberts, Roy Music, Orville Street and Ted Daniels, crew members, enthusiasm, willingness and courage in seeing the job through.

**ELEVATED SHUTTLE BELTS** at Robey Run permit 28 railroad cars to be loaded without being moved once they are placed. Two belts provide flexibility and permit two sizes to be loaded simultaneously.

# How Robey Run Gets High Output

**All-belt haulage underground and an unusual shuttle-belt railroad-car loading system help achieve 20 tons per employee at Ruby mine.**

APPLICATION of modern methods designed to conserve human effort was the keynote in the development of the Ruby mine of the Robey Run Coal Co., Dola, W. Va. Effectiveness of the program is confirmed by an average output of 1,000 tpd with only 50 men on the payroll. Contributing to this better than average record are: (1) an unusual shuttle-belt railroad-car loading system operated by one man; (2) a 3,000-ton stockpile that permits two-shift mining with one-shift preparation; and (3) all-belt haulage from the section to the stockpile.

Ruby mine was opened on April 11, 1952 to replace tonnage from the

**DISCHARGE GATES** in bottom of conveyor can be regulated to drop a different size to each elevated shuttle belt.

**CAR LOADING** is by chute or adjustable boom which permit continuous loading with elevated shuttle belts.

**STOCKPILE** holds 3,000 tons of raw coal and permits double-shift mining with single-shift tipple operation.

Robey Run No. 1 mine which was nearing depletion. The mine taps a 1,000-acre tract of Pittsburgh No. 8 coal which averages 6 to 7 ft in thickness and outcrops on Bennett Run off TenMile Creek where the mine is located. The coal dips about 1½% to the southwest, is free of clay veins and workings are comparatively dry.

Opened with three drifts on 70-ft centers, Ruby mine was expanded to a six-heading system as soon as roof conditions permitted. Breakthroughs, on 80-ft centers, were driven right and left off the No. 3 heading at 70 deg to permit shuttle-car speed to be as fast as possible. This North Main entry was driven 2,000 ft, after which seven headings, on 75-ft centers, were turned to the east to develop the territory adjacent to the south property line.

As the No. 1 East Main was developed, room panels were driven south to the property line and pillars were partially recovered by splitting. Approximately 65% of the coal was recovered by this method.

Production currently is coming from the No. 4 South panel off No. 1 East Main. After the area south of the No. 1 East Main has been completely mined, room panels will be driven north off the No. 1 East Main to a depth of 2,400 ft to recover the remaining coal.

Robey Run's entire output is produced by one loading unit, operated two shifts per day. Crews average 20 to 25 cuts per shift, or 500 tons. Factors contributing to this consistently high output are uninterrupted haulage and infrequent delays resulting from equipment down time.

Section equipment consists of a Joy 11-BU loader; two 42-E shuttle cars; 10-RU cutter with 9-ft bar and Tracy chain and Kennametal bits; Joy compressor mounted in a 42-E shuttle car; Joy and Cleveland stopers; Ingersoll-Rand impact wrench; and Chicago-Pneumatic handheld coal drills.

Coal is top cut to a depth of 8½ ft and 10 in of high-ash top coal is left for roof support. A vertical shear is made along the left rib. The cutter is equipped with a steel water tank and spray water is delivered to the cutter-bar by a Flex roller pump. To eliminate the need for buying and maintaining a small electric motor to drive the pump, it was mounted above the pump motor of the cutter and suitable pulleys were attached to the shafts of the spray pump and the hydraulic pump motor so the spray unit could be belt driven by the cutter pump.

Expansion-type 5-ft Bethlehem and West Virginia Steel roof bolts are installed on 4- to 4½-ft centers and provide the main roof support. At intersections, a crossbar is installed diagonally, with roof bolts to provide additional support. Expansion shells are supplied by Ohio Brass and West Virginia Steel.

Spare equipment is a key factor in keeping production at a consistently high level. To prevent delays resulting from down time and to permit effective maintenance, there is available underground spare equipment consisting of an 11-BU loader, two 42-E shuttle cars, and a 10-RU cutter. These units are maintained in top operating condition and are located near the working area where they can be put into service in a short time in event of a breakdown.

Section crews are made up of the following men: 1 loader operator; 1 loader helper; 1 cutter operator; 1 cutter helper; 2 drillers and shooters; 2 shuttle-car drivers; 3 roof-bolters; 1 scraper; 1 mechanic; and 1 foreman; a total of 14.

General inside work is performed on the first shift by a five-man crew, classified as follows: 1 belt man; 1 wire man; 1 brattice man and 2 supply men. On the second shift a belt man is the only general inside labor employed. Outside labor consists of 1 first-shift lampman; 1 second-shift lampman; and 1 general electrician.

## ALL BELT HAULAGE

A series of five 30-in belt conveyors carries the coal from the section to the 3,000-ton stockpile. Three Joy conveyors are installed underground in the North Main, East Main and No. 4 South entries. A fourth Joy unit elevates the coal from the portal to a 45-ft Hewitt-Robins movable belt at the top of the stockpile. To permit a maximum of coal to stockpile without rehandling, the 45-ft belt was mounted on wheels so the discharge end could be swung through a 30-ft arc and thus distribute coal over a wider area.

A 70-ton rock bin, located beneath the discharge end of the elevating conveyor, is used to store mine refuse carried outside by belt. A fly gate mounted at the end of the elevating belt permits rock to be diverted to the bin easily.

The East Main and the No. 4 South conveyors are driven by 280-v DC motors while the North Main, elevating and movable units are driven by 220-v AC motors. The North Main and East Main units are driven by 40-hp motors, the No. 4 South and elevating drives are powered by 25-hp motors, and the 45-ft movable unit is driven by a 5-hp unit. Belt speeds are 400 fpm for the No. 4 South and the East Main units and 450 ft for the others. The underground and elevating conveyors are equipped with Goodyear belt and the movable unit with Hewitt-Robins.

A 42-in supply track parallels the belt system and is extended with each addition to the conveyor. Track is laid with 30-lb rail on Bethlehem steel ties. An Ironton battery locomotive, equipped with Edison batteries, handles supplies between the outside and

**HIGH-CAPACITY LOADER** averages 500 tons per shift at Robey Run. Unit is served by two shuttle cars.

**TRANSPORTATION** from the section to the stockpile adjacent to the tipple is handled by a series of 30-in belts.

**ROOF-BOLTING** is assigned to three-man crew equipped with two stopers and compressor mounted in a shuttle car.
**ROBEY RUN SUPERVISORS**—John Spino (left), superintendent; E. H. Mahaffey, day-shift mine foreman; and K. H Currey, preparation foreman.

the working areas on each shift.

Air for ventilating the mine is supplied by a 6-ft Jeffrey Aerodyne fan powered by a 25-hp 440-v AC Westinghouse motor. The fan currently is delivering 50,000 cfm at a 1¾-in water gage.

Power is purchased from the West Penn Power Co. at 4,400 v and delivered underground through a borehole. A 400-kw Westinghouse rectifier converts power to 280 v DC for operating the mining equipment.

## PREPARING THE COAL

Under the stockpile is a 36-in adjustable reciprocating feeder that can deliver up to 300 tph to a 30-in Hewitt-Robins elevating belt conveyor. The R-O-M coal is conveyed to the top of the tipple and discharged onto a double-deck screen, equipped with Hendrick lip screens, and separated into plus 5-in lump, 5x2½, 2½x1 and 1x0 sizes before it is hand-picked.

After the 5-in lump is scalped off, the impurities are split off of it with picks. The 5x2½ is hand-picked on the second deck and the 2½x1 flows to a 40-in belt for hand-picking. All hand-picked products may be delivered to a two-stage double-roll Gundlach crusher, powered by a 40-hp Westinghouse motor, and reduced in size according to customers needs. It also is possible to by-pass any of the sizes, if desired.

Hand-picked refuse is directed by chute to a scraper conveyor and elevated to an 18-ton refuse bin for later removal to a refuse area.

The crusher product and any by-passed coal is delivered to a 36-in scraper conveyor, powered by a 30-hp General Electric motor, and elevated to a pair of Allis-Chalmers 6x16-ft Ripl-Flo vibrators equipped with Tyler screens. One of these is a double-deck unit and the other has three decks. One vibrator usually handles the screening job, while the second unit provides additional capacity for screening damp coal. It also permits an instantaneous change in sizes without stopping the coal flow in the plant since the screen change can be made on the idle unit and coal diverted to it as desired.

If R-O-M coal is being loaded, the vibrators are by-passed and the coal is delivered to a belt conveyor which carries it to the 3-compartment scraper feeding the shuttle belts.

If 1¼x¾ stoker and ¾x0 are being

***How two useful "Operating Ideas" Save time and expense at Robey Run***

## Cutter Drives Spray Pump

EXTENDING the shaft of the hydraulic pump motor and adding a pulley has made it possible for the hydraulic pump motor of a 10-RU cutter to be used to drive the spray pump. Product of an idea from John Spino, superintendent, Robey Run Coal Co., Dola, W. Va., the simple arrangement eliminated the need for an electric motor to drive the pump which delivers water to the cutterbar. The pump is mounted above the hydraulic motor and level with the bottom of the water tank installed on the rear of the cutter.

## Curtain Installed Quickly

INSTALLING brattice cloth is fast and easy at the Ruby mine of the Robey Run Coal Co., Dola, W. Va. Here's how the job is done. A 2x6-in by 14-ft header is set on wood posts, and long nails on 3-ft centers are driven horizontally part way into the wood. Then a piece of scrap telephone wire is strung between the nails adjacent to the ribs. Over the wire is hung a piece of brattice cloth which is prevented from sliding off the wire by fastening it in place with nails through the cloth. The cloth then is split in the middle to permit shuttle cars to pass through easily. The curtain can be slid back and forth on the wire as desired. It is shown partially opened in the photo.

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loaded, the plus 1¼ is screened out on the top deck of the triple-deck vibrator, delivered to a 20-in Hewitt-Robins belt conveyor and transferred to a second 20-in unit which recirculates it to the crusher.

### SHUTTLE-BELT CAR LOADING

In place of conventional railroad-car loading facilities, Robey Run has installed two reversible shuttle belts that permit loading 28 cars on two tracks without moving them once they have been set in. Thus there is no need for car droppers at the tipple.

One man operates both belts from the discharge end and trams them back and forth over the two rows of cars. Belts are wheel-mounted Hewitt-Robins units, 186 ft long and powered by 15-hp 440-v Sterling Speedtrol variable-speed AC motors. On the opposite ends of each belt are adjustable loading booms that are lowered into the railroad cars to prevent degradation when grade sizes are being loaded.

To prevent spillage when a discharging belt is moved over an empty car, a short retractable chute attached to the end of the adjustable boom is raised parallel to the belt. This reverses the direction of coal flow and delivers it to the new car without spillage. Two-way chutes with fly gates are attached to the other ends of the shuttle belts and also permit coal loading to be continuous. These chutes were added to the conveyors to speed loading and have made it possible for an additional three cars to be loaded per shift.

Coal is dropped onto the belts through gates in the bottom of the 3-compartment drag conveyor. Two different sizes may be loaded by positioning one gate to remove coal from one compartment and opening the other to permit the remainder to drop on the second belt.

A ¾-yd Lorain gasoline shovel is used to transfer coal from the outer edge of the stockpile to a point where it will flow by gravity to the tipple feeder. Also available for cleanup work around the stockpile and for cleaning the tracks under the shuttle belts is a Hough Payloader. This unit permits one man to do in 4 hr the work formerly done by four men in one shift.

Personnel assigned to the tipple consists of 6 slate pickers; 1 shuttle-belt operator; 1 greaser; 1 mechanic; 1 cleanup man; 1 shovel operator; and 1 foreman; a total of 12.

### CONTROLLING THE BELTS

One man operates both shuttle belts from controls located at ends of the belts. One switch controls forward and reverse movement of the belt and other controls the tramming hoist used to pull the belt back and forth over the cars. A push-button control for raising and lowering the booms is provided with the controls on the ends equipped with the booms.

In addition to the conventional belt controls, there is an emergency-stop switch that permits the operator to stop both belts and all tipple equipment back to the feeder under the stockpile. Belts may be operated independently by taking them out of sequence at the main control board in the tipple.

Power for the shuttle units is carried to six fixed wheels mounted on the supporting structure. These make contact with six bare copper wires mounted along each conveyor frame and are connected to the belt controls. Three wires deliver 440-v AC power to the belt drives and the remainder are connected to the 220-v tipple control system.

Interstate Engineers & Constructors, Fairmont, W. Va., handled fabrication and erection of the shuttle belt and tipple and Archineer Design Associates, also of Fairmont, co-operated in the design. Electrical controls were installed by the West Virginia Electrical Co., Inc., Fairmont, W. Va.

John Spino is superintendent of Ruby mine. Other key personnel at the mine are: E. H. Mahaffey, first-shift mine foreman; Wallace Cooley, second-shift mine foreman; and K. H. Currey, preparation foreman.

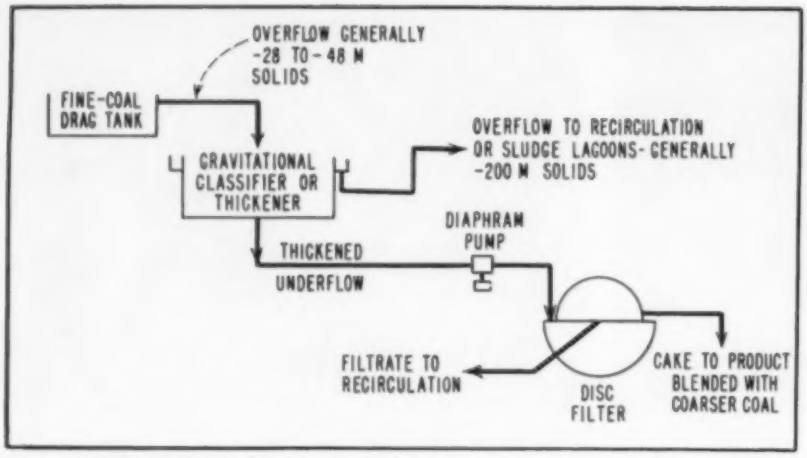


FIG. 1—**GRAVITY CLASSIFIERS** or thickeners for preliminary classification.

## Continuous Vacuum Filtration Systems

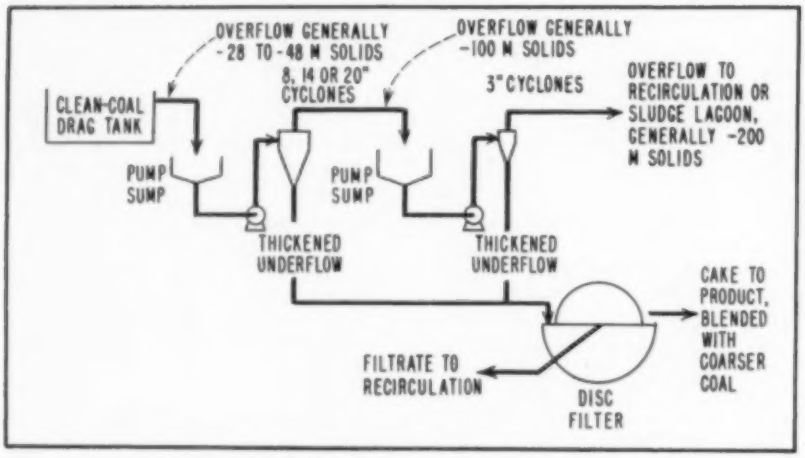


FIG. 2—**CYCLONES** for preliminary classification.

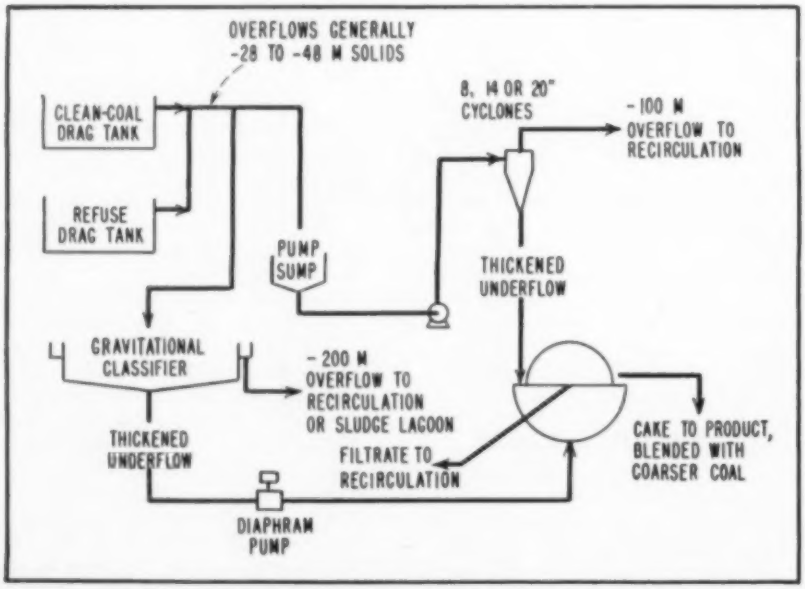


FIG. 3—**GRAVITY THICKENERS** and cyclones for preliminary classification.

# Continuous

## What They Are
## How They Are Used
## What They Do

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RECOVERY of minus 28 M coal has become increasingly important in recent years—and with this accelerated rise in fine-coal cleaning and recovery has come increased emphasis on closed water circuits. This article will discuss the use of continuous filtration—particularly with the disc-type unit—in the recovery and dewatering of coal finer than 28 M and the closing of plant circuits.

Where the ash content of the solids in the circulating water is low enough so that such solids can be blended with the coarser coal, it is possible to close the circuit with cyclones or other classifiers followed by dewatering of the underflows with vacuum filters. However, when the solids buildup results from clay slimes of colloidal or near-colloidal size, additional measures normally are necessary to close the circuit. One procedure is separation of the fine coal from the slime fraction and then treating the slime by flocculation, thickening and dewatering. This process is still in the development stage but undoubtedly will be a necessity in many preparation plants in the near future.

Reasons for this increase in filtration and slime treatment include:

1. Lack of space for the necessary slime ponds at many operations. As full-seam continuous mining grows, the problem will be increased by rising production of slimes, in turn increasing already high pumping and pond-cleaning costs. With the economical slime-solids recovery now possible, it is cheaper to dispose of such solids with the coarse refuse.

# Disc Filters for Fine Coal

2. Increasingly stringent stream-pollution laws and regulations, which may eventually practically prevent stream disposal of undissolved solids, including surface runoff of slimes from sludge ponds.

Unless special considerations dictate the use of other types, the disc-type filter normally is the most economical, since it provides the lowest operating cost and requires the least floor space per square foot of filtering area.

## FILTERING SYSTEMS

Where clay slimes are not excessive and closed-circuit operation can be obtained by vacuum filtration, or where the large slime fraction is bled off to a sludge pond, three of the possible filtration systems are as follows:

**1. Gravity Classifier or Thickener Delivering Thickened Underflow for Filtration**—The conventional flowsheet for such a system is shown in Fig. 1. A similar parallel circuit normally is provided for the fine refuse. The circuits originate in fine-coal or refuse drag tanks. The fine-coal and refuse streams, generally containing primarily minus 28 or 48 M solids, are fed to gravity classifiers or thickeners. These units usually are designed to separate at 30 to 50 microns.

The thickener overflow is returned to circulating water where the circuit is closed, or a sufficient volume is discharged to the slime pond to prevent buildup where this fraction is excessive. The thickener underflow goes to the filter, and the cake is either product coal or refuse depending upon the feed. Filtrate is returned to circulation water, although in at least one instance, a 200-ppm filtrate is being used as pump-gland water.

In many instances, the ash contents of overflows from both the fine coal and refuse tanks are approximately the same, and a single thickener can be used for both. However, if the two streams must be kept separate, substantial economies may be achieved by putting a compartment in the filter tank to divide it into clean-coal and refuse sections, discharging the two types of cake to separate conveyors.

**2. Cyclone Classifiers in Conjunction with Filters**—Except for cyclones, the circuit is similar to that shown in Fig. 1 for gravity classifiers and thickeners. A two-stage cyclone system, as shown in Fig. 2, also may be employed in two distinct applications:

A. Solids under 100 M too high in ash to be included in the clean-coal product. The larger cyclones make a 100 to 140 M separation, with the underflow suitable for filtration and blending with the coarser coal. The 3-in cyclones, with their greater centrifugal force, separate at under 200 M, and these solids are filtered and sent to refuse.

B. All underflows from both stages filtered as clean coal.

In both instances, the 3-in cyclones prevent a buildup of minus 100 M solids in the circulating water. Where the quantity of minus 100 M is sufficiently low, only the larger-diameter cyclones are necessary. As with gravity classifiers or thickeners, it also is possible to combine coal and refuse, or to compartment and filter separately on the same machine.

Both the gravity classifier and the cyclone can be used as preliminary thickeners for the filter feed, and each offers specific advantages. The classifier can deliver a maximum-concentration underflow in spite of changes in per cent of solids in the feed, or volume of feed itself, and maintenance and direct operating costs are low. On the other hand, cyclones have an appreciably lower first cost, require a minimum of floor space, make sharper classification, and provide instantaneous separation, permitting the water circuit to reach equilibrium in a much shorter time.

Of special interest is the fact that the cyclone has been proved the most efficient desliming classifier, which makes it particularly useful when this fraction must be separated from minus 28 M coal. However, in selecting the preliminary thickening device, a thorough study should be made with regard to economics, ease of operation and other important factors.

**3. Thickeners and Cyclones for Preliminary Concentration**—The combination of gravity thickeners and cyclones shown in Fig. 3 has certain advantages. A portion of the clean coal and/or the refuse overflows from the drag tank or tanks is sent to the large cyclones, while the remainder goes to the gravity thickener. The cyclone underflow is deslimed efficiently and fed to the downcoming side of the disc filter.

The instantaneous separating power of the cyclone will remove the plus 100 to 140 M solids immediately and thus reduce the solids load on the thickener. This enables the thickener to produce a finer solids underflow, which is bottom-fed to the filters. At the same time, a finer overflow product is achieved. The advantages are:

A. The filter receives a "precoat" of coarser solids, which not only raises the filtration rate but also facilitates cake discharge.

B. The thickener underflow delivers the finer solids at maximum pulp density, materially raising the filtration rate. This is particularly advantageous where the solids concentration in the preliminary-classifier feed changes with time.

C. Feed to the filter is generally coarser as a result of instantaneous separation in the cyclone.

D. The coarser solids bridge the meshes and thus eliminate blinding of the filter media.

E. Thickener surge capacity permits keeping underflow feed to the filter at the proper rate.

It should be stressed again that while each flowsheet possesses certain advantages, the final choice requires careful economic and technical investigation. However, preliminary classification and/or thickening is necessary for effective, economical filter operation.

## SLIME REMOVAL

As previously indicated in this article, there undoubtedly will be an increasing need for economic methods of removing clay slimes from circulating water to prevent buildup and make it possible to close circuits. Otherwise, expensive bleeding to ponds is necessary. The goal is mechanical removal of these slimes to permit them to be handled like any other solid refuse. Preliminary experience indicates that proper use of flocculating agents and thickening techniques will produce, at minimum cost, a sludge that can be filtered, thus achieving the goal.

The proposed method of removing slimes may be incorporated into any circuit. Three variations of the recommended slime-removal flowsheet are shown in Fig. 4. Variation A is recom-

# Selecting and Operating the Continuous Disc Filter

**Standard Disc Filter**—More widely used; no agitation employed; instead, tank is partially baffled around each disc to minimize settling and holdup time.

**Agitation Type**—Applicable where solids content of the feed is such that gravitational settling cannot be prevented. Agitator in base of tank keeps solids in suspension and prevents settlement on side walls.

**Filter Size**—Must be such that disc sectors are properly submerged during the filtration portion of the cycle. At the same time, filter overflow must be small or non-existent, since it is returned to the circulating water, adding to the difficulty of plant operation.

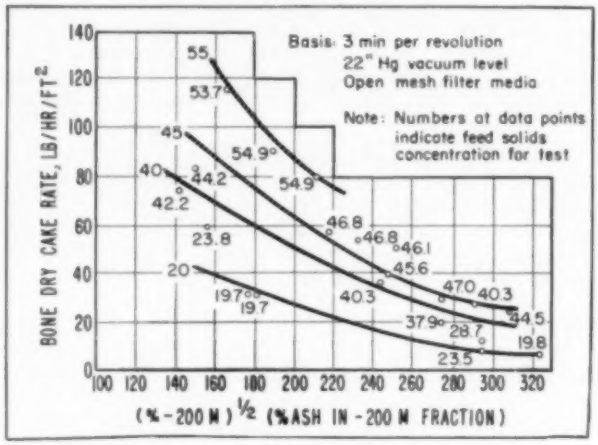
**Filter Medium**—Major factor in the wide use of the disc filter had been the development of new filter mediums to replace cotton. These include nylon, Saran, polyethylene and stainless steel (60x40 M most generally used). A more-open mesh and bridging of meshes with plus 200 M solids increases filtration rates and efficiencies, while elimination of rubbing against the scraper increases medium life.

**Feeding the Filter**—The two usual methods are: (1) bottom feed and (2) side feed paralleling the movement of the discs on the downcoming side. Side feed is preferred for these reasons:

A. Each disc can be fed separately.
B. Segregation of solids is reduced to a minimum.
C. The coarser solids tend to deposit on the filter medium first, making the filter cake easier to discharge.

Bottom feed should be used only where the solids are relatively fine—50% or more minus 200 M. If particles are too coarse, homogenous distribution of feed slurry to all discs is difficult to obtain, and feed lines may be plugged by the settling out of the coarser solids. Side feeding also reduces pipe requirements.

**Cake Discharge**—A low-pressure blowback should be used to dislodge the filter cake from the filter medium. If proper cake formation is obtained, the scraper blades have only to nudge the cake to secure discharge. Thus, the scrapers need not touch the medium, increasing its life. The scraper blades on each side of each disc should be designed to permit both horizontal and vertical movement as necessary to suit each disc. And for efficient discharge, the cycle time should provide a minimum cake thickness of approximately 3/16 in.




**Securing Maximum Filtration Rate**—Critical factors are percentage of minus 200 M in the feed and the ash content of this fraction, in turn a reflection of the clay slime content. The greater the percentage of either of the two factors, the lower the filtration rate with normal coal.

The interaction of these two factors is expressed by the function per cent minus 200 M to the one-half power multiplied by per cent ash in the minus 200 M. The accompanying chart, including four curves for four different solids concentrations in the feed, incorporates this function and may be used to predict filtration rates and therefore filter size for normal fine coal—not flotation coal or coal subjected to excessive attrition, as examples.

In addition to increasing the filtration rate, maximum solids concentration reduces segregation in the tank and

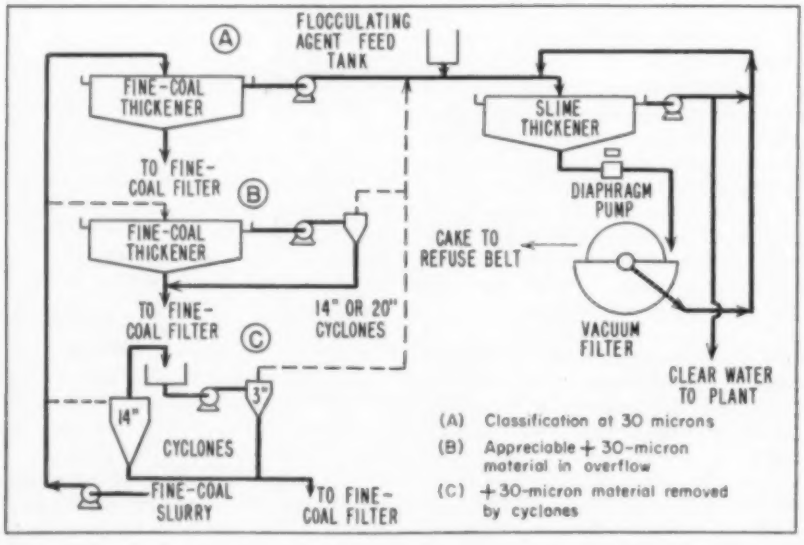



FIG. 4—SLIME REMOVAL, employing flocculation and filtration.

mended where the fine-coal circuit includes a gravity classifier effectively classifying at about 30 microns. The thickener overflow is diluted to 4 to 5% solids, as required, and then is treated with the proper flocculating agent. The slurry then goes to a thickener where the floc settles out and concentrates in the underflow to about 20% solids.

This concentrated sludge is fed to a drum or disc filter by a diaphragm pump, keeping shear stress on the floc to a minimum. The filter cake goes to the regular refuse-disposal facilities, while the filtrate, with part of the clear thickener overflow, is used to dilute the raw feed. The remainder of the thickener overflow is returned to the washing circuit.

If gravity classification is such that an appreciable quantity of plus 30-micron material is found in the overflow, this stream could be pumped through a battery of 3-in cyclones, as

also the solids content of the filtrate. As a rule, plus 28 M material should not exceed 10% to prevent settlement in the tank, though percentages over 10 are possible where total solids concentration exceeds 50%.

The data necessary for using the chart are easy to develop in ordinary plant operation. The curves may be corrected to other cycle times and vacuums by the following formula:

$$Z_c = Z_1 \left( \frac{\theta_1}{3} \frac{22}{\Delta P_1} \right)^{\frac{1}{2}}$$

Where $Z_c$ is corrected dry cake rate at 22 in of mercury and 3 min per revolution;

$Z_1$ is dry cake rate at desired cycle time and vacuum;

$\theta_1$ is desired minutes per revolution;

And $\Delta P_1$ is desired vacuum level.

**Securing Maximum Moisture Removal**—Factors substantially influencing cake moisture are:

1. Size distribution of solids. Higher percentages of fines increase the surface area which can hold moisture, and thus result in higher cake moisture. For example, in coal nominally minus 28 M, only 2.5% of minus 200 M will account for 95% or more of the surface.

2. Cake permeability.

3. Wetting-agent concentration, if a wetting agent is used. High concentrations, on the order of 0.1% by weight, are not economically feasible, but studies are now being made to ascertain the possibilities of confining the wetting agent to the filter station only, which would be a major benefit from the standpoint of reducing cake moisture to a minimum.

4. Filtrate viscosity. If the circulating water could be maintained at 80 F, for example, a material reduction in final cake moisture is possible. By closing the water circuit, it becomes economically feasible to maintain 80 F and thereby secure these advantages:

A. Appreciable reduction in final cake moisture.

B. Elimination or a material reduction in thermal drying in many instances as a result of increased filtration efficiency. Elimination or reduction of thermal drying also eliminates or reduces associated dust problems.

C. Freezeproofing can be attained by loading 80 F coal.

D. The expense of closing a water circuit to reduce or eliminate stream pollution can be eliminated.

5. Surface properties and other characteristics of the coal.

6. Inherent moisture in the coal.

Factors with a moderate influence on final cake moisture include air or gas rate per unit of filtration, pressure drop across the cake, drying time, cake thickness, and filter medium. Among filter media, for example, cotton twill will result in moisture 1.4 to 2.7 points under 60x40 M stainless screen, but this is offset by the considerably higher filtration rate of the screen media. The effect of various filter media on final cake moisture is best ascertained by leaf tests, which also are best for determining the filtration rate.

Finally, surface tension of the filtrate has only a negligible influence on final cake moisture.

**Filtrate Clarity**—The extent to which filtration removes solids is a function of particle-size distribution, solids concentration in the feed, filter-cake thickness, cycle time, and type of filter medium. "Bridging" of the filter medium is a major factor in solids removal. More solids will pass as the percentage of minus 200 M or the size of the meshes increases. Bridging, however, reduces the rate of passage very sharply in a short time, since the cake itself is a very efficient filtering medium. Bridging is facilitated by higher solids concentration in the feed, proper cake thickness and proper cycle time. A second major factor reflects per cent of minus 200 M and also its ash content, which in turn are indications of cake permeability.

Properly designed and operated, the continuous disc filter recovers all size fractions to a very great extent and performs an efficient solid-liquid separation. Total solids recovery in one pass through the filter is always 93% or more, and when the minus 200 M in the feed is 50% or less, recovery is 99% or better. Furthermore, minus 200 M recovery ranges from around 87½% to around 98%, and averages over 97% when this fraction is less than 50% of the feed. As the filtrate will generally range from 200 ppm to 3% solids, it can be recycled to plant circulating water without causing a solids buildup from this source. Thus, when correctly designed and installed, all size fractions of solids can be removed from the plant as fast as they enter or are created within the preparation system.

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in Variation B, Fig. 4, before flocculation. If the equivalent of two-stage cyclone operation was employed to concentrate fine coal then Variation C would be recommended. But regardless of the type of washing circuit, the stream containing the greatest amount of minus 30-micron solids is the stream to be treated for slime removal. Also, preliminary experience indicates the following:

1. The solids concentration of the slurry must be less than at the beginning of the thickener compression zone; otherwise, thickening is ineffective. Dilution to achieve this also reduces the quantity of flocculating agent necessary and increases the thickener settling rate.

2. Variations in the dilution of the feed slurry before flocculation have no effect on subsequent filtration rates. In other words, filtrate and dry-cake production rates are unchanged.

3. Preliminary tests should be made to determine the most effective flocculating agent (hydrated lime, pregelatinized starch, etc.) from the standpoints of both settling and filtration. For a certain type of solids, one agent may be much more effective than another.

4. Constant-rate-zone settling rates of the flocculated solids may be expected to be as high as 0.11 fpm.

5. Dry filter-cake rates may be expected to be about 30 to 40 lb per hour per square foot of filter surface, with a 3-min cycle, 50% submergence, and a 35% concentration of solids in the filter feed.

## REFERENCES

Theory, formulas, calculations and charts for more detailed study of filtration operations can be found in the following selected references:


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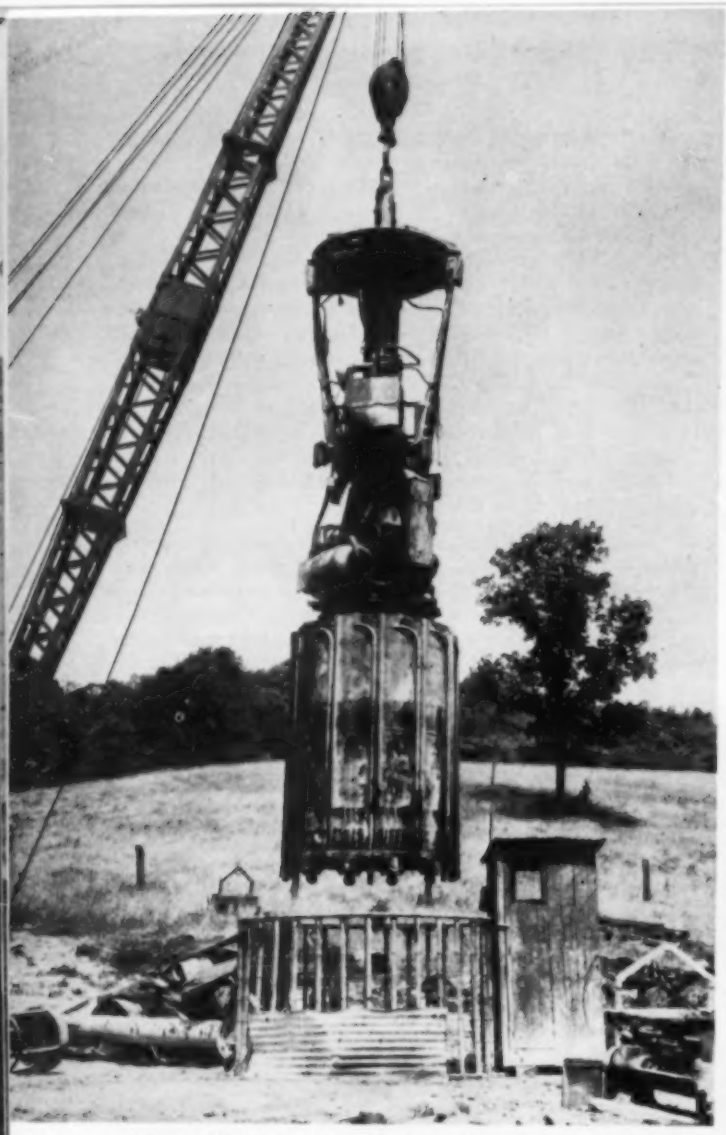
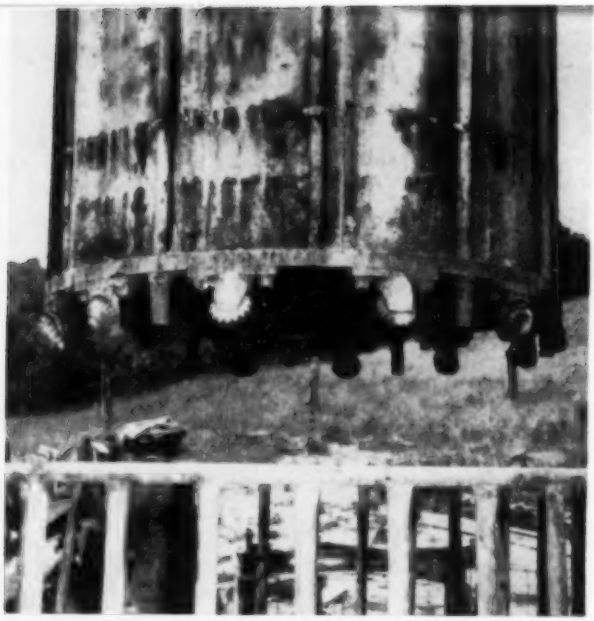
**Heating to Reduce Viscosity**—"Economic Dewatering of Coal," Silverblatt & Dahlstrom, Joint Fuels Conference, AIME-ASME, 1953.

**Cake Moisture, Prediction of Plant Results**—In addition to preceding references, "The Effect of Viscosity and Surface Tension Upon the Moisture Content of a Fine-Coal Filter Cake," Silverblatt & Dahlstrom, Amer. Chem. Soc., 1953.

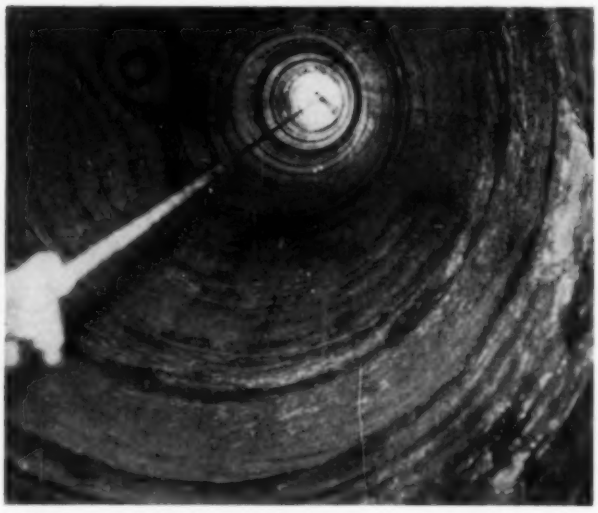
**Theory, Formulas, Mathematical and Graphical Prediction of Results**—"Theory and Practice of Continuous Filtration of Fine Coal and Slimes," Silverblatt & Dahlstrom, Second Int. Coal Prep. Cong., 1954.



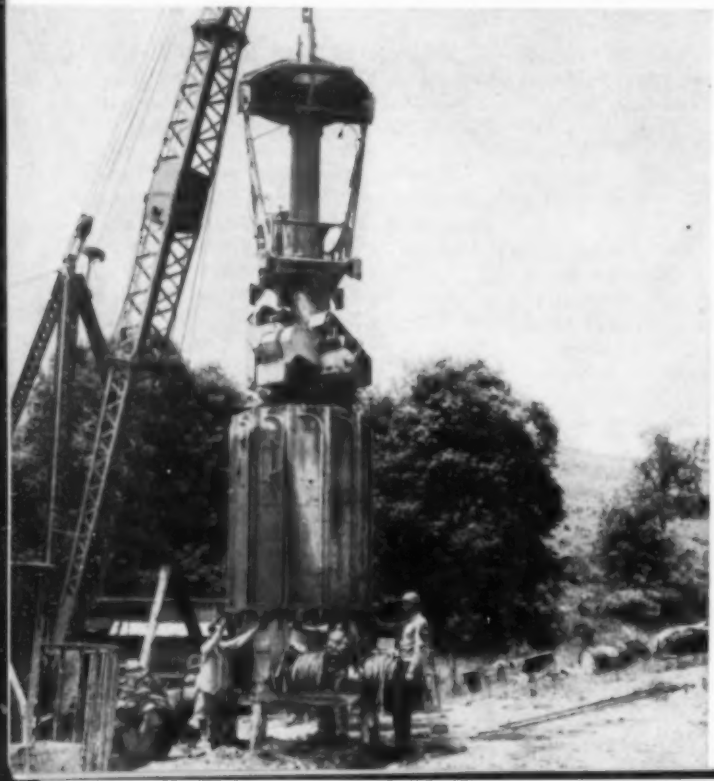
**NEW CORE DRILL** is the first application of oil-well-type cutters to cut a 75-in hole. Unit recently completed 467-ft shaft for the Trotter Coal Co., Morgantown, W. Va.



**CUTTING HEAD** has 12 oil-well-type rolling cutting elements equally spaced about circumference. Alternate pairs of bits face in opposite directions.



**SMOOTH STRAIGHT HOLE** is cut by drill. Steel lining will be concreted in place as final step.



**CORE PULLER** lifts 5½-ft section of rock from hole. Six rollers wedge core in puller, preventing slippage. Hoist (left) pulls 10-ton drill to surface at 125 fpm.

# New Drill Cuts 75-in Hole

- **Penetrates soft shale at 4 ft per hour and limestone and sandstone at 1 ft per hour**
- **Cuts cost of shaft sinking**
- **Provides smooth shaft wall**

BRIGHT PROSPECTS for cutting the cost of sinking new air- and man-shafts are in view as a result of the development of a new-type 75-in core drill, designed and built by the Coal State Construction Co., Morgantown, W. Va. The new unit, serial No. X1-12-53, recently bored a 75-in hole 467 ft deep for the Trotter Coal Co., Morgantown, W. Va. A six-man team, the same men who designed and built the unit, performed all the work in putting down the new shaft. They have applied for patents on the new drill and accessories which successfully completed the shaft in July, 1954.

The drill cut through 81½ ft of limestone, 99½ ft of sandstone and 286 ft of shales at the new Trotter shaft. As drilling progressed, speed of rotation and hydraulic pressure were varied to obtain data and the most effective combination for drilling in the various formations. This experimental work slowed drilling somewhat, but provided valuable information for future drilling. On the basis of performance of the drill in sinking the new shaft, Coal State has been awarded a contract to drill a second shaft for the Trotter Coal Co.

"Shaft sinking always has been more or less primitive, requiring much human effort. And it was costly. When we got into the construction business, we decided to do something about it. We built our new drill to make shaft sinking a mechanical operation and to get the cost down. We believe that many more airshafts and escapeways would be installed if the cost of putting them in was low enough. We aim to do that with our drill." That's how the men of the Coal State Construction Co. summed up why the drill was built.

### THE MEN BEHIND THE DRILL

Chartered in June, 1950, the Coal State Construction Co. is a six-man organization whose skills and hard work have been combined to develop the new drill. Making up the group are the four Zeni brothers, Victor, Albino, Angelo and Germain, and Charles M. Swope and Reno Viola. Three of the Zeni brothers and Swope are skilled electricians and mechanics, having had many years experience as chief electricians for coal companies before going into the construction business.

Victor was chief electrician for the Pursglove Coal Co. from 1932 to 1944 and was succeeded by Albino, who held the job until 1947 when he pulled up stakes and went to California to do maintenance work for the Southern Pacific R.R. and try his hand at construction work. Angelo was chief electrician at the Pursglove No. 1 and No. 5 mines from 1933 to 1947, when he went to California with Albino. While on the west coast, he was in the construction business, did maintenance work for the Pullman Co. and was a maintenance manager for the Coca Cola Co.

Swope was maintenance foreman at Pursglove No. 2 from 1935 to 1942, when he became mine superintendent. After 6 yr in that position and 4 more in other supervisory jobs, he resigned to join Coal State in 1952.

Reno Viola, an experienced hoist engineer, joined the company in 1952 when the organization needed a man with his qualifications. Since joining the company, he has increased his skills and has become a top flight welder.

Germain Zeni joined the company in 1951 and has been in charge of supplies. He is a trained barber and many times was called on to set up a shop on the job because the men did not want to take time from the job to go to town for a haircut.

### EARLY EXPERIMENTS

Efforts to mechanize shaft sinking began soon after the company was organized, the first improvement being application of a clamshell to remove blasted material from a shaft. Among the early achievements was sinking a 13-ft-diameter shaft 525 ft deep in 7½ mo with only four men.

To make shaft sinking a mechanized operation, Coal State decided that some drilling technique should replace conventional methods. The first experiment was conducted with a special jackhammer fitted with five bits to determine if it would be practicable to drill a 6-ft-diameter shaft with this type of unit. Results indicated that such a method would be too costly.

The second test was made with a jackhammer pilot bit surrounded by other drills mounted in a V, or arrowhead, pattern. This method also was rejected.

Soon after the V pattern was conceived, Coal State contacted the Hughes Tool Co., of Houston, Texas, for advice. They asked the Hughes engineers if they could make a bit capable of cutting a 6-ft-diameter hole. The answer was that drilling a hole that size with one bit would not be practicable with ranges of weight on the bit proposed.

Attention next was focused on core-drilling methods, which offered interesting possibilities if a sufficiently large core could be cut. Coal State wrote to the Hughes Tool Co. in November, 1952, but this time asked their opinion on core drilling. Coal State suggested taking standard-type Hughes bits and installing sections of them about the periphery of a 6-ft-diameter cutting head. Hughes engineers did not recommend their standard bit section because they were not designed for that type service and they felt that such an installation would be impractical.

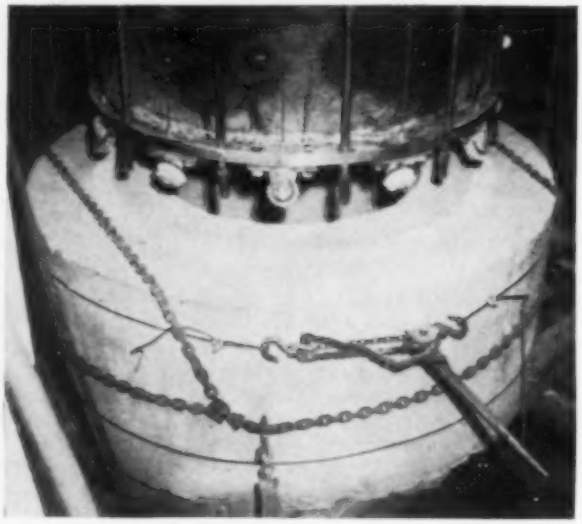
However, Coal State was determined to build a drill that would cut at least a 6-ft hole. On Dec. 5, 1952, they started building the unit, firmly believing that some bit would be available by the time it was completed.

Although correspondence with the Hughes Tool Co. had not been too encouraging, Coal State had not given up the idea of using the oil-well-type cutters. They decided to take their problem to Houston where they would be able to explain their ideas to bit engineers.

In January, 1953, four members of the organization, Victor, Albino and Angelo Zeni, and Charles M. Swope, drove to Houston to present their case to the Hughes Tool people. The Hughes research engineers were impressed with the possibilities of the new drill and agreed to undertake the task of designing a bit to handle the job of cutting a 75-in hole.

By June, 1953, the Hughes Tool organization had a full-scale pilot model of a cutting head built and set up in their research and engineering laboratory. A block of cast concrete, containing granite aggregate to make it as tough as possible, was selected as the material to test the cutting

**DESIGNERS AND BUILDERS** of the new drill. Front row: Victor Zeni (left) and Charles M. Swope. Rear: Germain Zeni (left), Angelo Zeni, Albino Zeni and Reno Viola.



**LABORATORY TEST** with model cutting head was performed on cast concrete block made with tough granite aggregate for maximum drilling resistance.

ability of the new cutting head. The experimental unit was fitted with 12 equally spaced cutters with alternate units facing in opposite directions and arranged in a 6-position pattern.

As a result of the laboratory tests, officials of the Hughes organization were impressed with the possibilities offered by the new drilling method and agreed to work with Coal State on field research for the new application. The tool company agreed to supply Coal State with bits for drilling the first hole and to give all the technical assistance possible.

Construction of the drill was completed in October, 1953, when it was put to work drilling the new shaft for the Trotter Coal Co. As drilling progressed, close contact was maintained by correspondence and frequent jobsite visits between Coal State and engineers of the Hughes Tool Co. Men of the Hughes organization who contributed to the project include D. J. Martin, vice president, engineering; F. L. Scott, research and design engineer; with valuable assistance from the Hughes engineering laboratory under the supervision of R. W. Schlumpf, chief metallurgist.

## DRILL DESIGN

Starting at the lower section of the 25-ft 10-ton unit, essential parts include the following:

1. A cutting ring on which the 12 Hughes rolling cutters are mounted. Cutters are arranged in pairs facing opposite directions and cut a 4-in kerf.

2. A 69-in O.D. core barrel which fits over the core as the cutters move downward.

3. A 36-in cuttings compartment which is used as a settling tank for cuttings drawn up from the bits by a vacuum pump. This section has capacity to hold the solids drilled from the 4-in kerf around the 67-in core. Twelve 1¼-in pipes, equally spaced around the exterior of the barrel, lead from the vacuum pump to the cutting head. Cuttings are removed from the compartment through ports after the drill is hoisted to the surface.

**FULL SIZE MODEL** of cutting head was built in bit-manufacturer's laboratory to test cutters and new technique.

4. The power section, which contains all the motors, gears and the hydraulic system for operating the drill. Included are a 25-hp, 440-v permissible motor for drill rotation through a worm drive; a vacuum pump, powered by a 7½-hp motor, for removing cuttings; a hydraulic pump, driven by a 5-hp motor, delivering oil at 500 psi to the 15-in jack that exerts downward pressure on the cutters.

The cutting head, core barrel and cuttings compartment rotate as a unit as the drill cuts, the power section remaining anchored. A two-direction 100-ton horizontal hydraulic jack holds the power section securely in place as the rotating section moves downward. To help steady the unit, four stabilizers are placed against the rock after the machine has been leveled with four adjusting screws.

After a 67-in core has been cut, the drill is pulled out of the hole by a 150-hp 440-v mine hoist. When the drill reaches the surface, it is swung onto a stand and disconnected from the hoist. A 67-in core puller then is attached to the hoist rope and lowered over the core. As the puller is moved upward, six equally spaced rollers produce a wedging action between the core and the puller, preventing the core from slipping. Cores are hauled to a disposal area by truck.

One man operates the drill. Fresh air is delivered through a regular blower and vent tube, as is used in conventional shaft sinking. Compressed air is used to cool the cutter bearings.

Air and power lines are handled in the shaft by a company-built twin-reel hoist. Each reel may be operated independently through a modified drive built from the transmission, differential and clutch of a 1½-ton International truck and powered by a 10-hp electric motor. To permit operation of the reels without breaking the flow of air or power, a swivel connection was made on the air reel and collector rings were installed on the power reel.

# The Coal Commentator

## Business in '55

**With bituminous production for 1954** winding up at around 390,000,000 tons, and anthracite at around 27,000,000 tons, the question now becomes: "What's ahead in 1955?" For bituminous coal, the answer will reflect the level of business activity, with adjustments for any competitive gains, and also the weather—the latter two most important to anthracite. While no one can forecast the weather, and gains by competitors can be expected, the picture in these respects will not be radically different in 1955.

What about business? The shot-callers see it as good at least for the first half—and probably for the entire year. Specifically, the electric-utility industry, as indicated on pp 54-55 of this issue, sees an increase that will require it to buy 20 million more tons of coal. In steel—coal's second most important customer—business is expected to be excellent, at least the first quarter. Mills serving the auto industry are sold out for the first 3 mo, and demand for other steel products is strong. Some steel men now think that the 1955 operating rate will average 85% of capacity—a sizable gain indeed. All in all, coal men can afford to be at least mildly optimistic.

## Ceiling Busters

**As you would expect,** the continuous miner is now turning out more and more coal and is beginning to reach for the tonnages established by conventional mining units. At least two of the new high-capacity models, with shuttle-car haulage, are averaging around 400 tons per shift; some are getting over 500 tons per shift a third or more of the time; and one unit in 3½-ft coal with conveyor transportation is reported to be averaging over 800 tons. As the bugs are worked out and the machines operate a greater part of their possible shift time, the day when a labor cost of $2 a ton or less will be fairly common in coal mining will become a reality. As a matter of fact, it may not be too far off. An informal canvass of operating men at a recent industry meeting showed an unexpected number of deep mines already in this category, using conventional equipment.

## FPC and Gas

**It isn't really unanimous,** though it looks almost so at times. The number of people and organizations taking potshots at FPC for moving into regulation of natural-gas production seems to be growing almost by leaps and bounds. Of course, it may be that the proponents are merely lying low and saying nothing. Recent declarations of war, in addition to the governor of Texas (p 53 of this issue), include the Oil and Gas Dept. of the Empire Trust Co., New York, which took a full page advertisement in the New York *Times* of Dec. 12 to damn the idea all ways from Sunday. So coal is getting help in at least one of its projects from unexpected sources, and when the dust settles it can hope for a return to conditions that will give it a fair chance at markets it can serve.

## Pythons in Coal

**Newest British nomination** to the list of machines designed for continuous mining off longwall faces is the Anderton shearer-loader. Like several others, it rides on a chain-type face unit, known as an "armored conveyor" in British circles. The mining element is a series of revolving disks on a shaft at right angles to the machine body. A plow moves the coal onto the armored conveyor as the machine is pulled along the face by wire ropes. Disk diameter is 40 in, and four disks result in a cut depth of 16 to 18 in. Top coal is permitted to fall or, if it sticks, is shot down. A feature of the armored conveyor is that it can be snaked without affecting operation. This feature, in fact, has resulted in applying the word "python" to certain units of this type in use abroad.

## Success Story

**How the "Minute Men" saved a school** and 3,000 tons of business a year from oil is described in a market-development report in the National Coal Association Bulletin of Dec. 10. The fight began last February when the board of the Indianapolis Arsenal Technical Schools decided to replace its outmoded coal-burning equipment and at the same time consider a change in fuel type. The board turned the project over to consulting engineering firm that was not only inclined to oil but was not even interested in hearing about coal. That was the situation when the "Minute Men" group, composed of producers and retailers, stepped into the picture. The job was so good that oil, even after a second and harder try, was unable to shake the school board's decision.

**Moral?** When coal really decides to put up a fight, it almost always has a better than even chance of winning on its merits against the best oil and gas can put up.

**HARDBURLY PRODUCTION** involves both mechanical mining underground and augering around outcrop to increase recovery. Auger has been fitted with auxiliary conveyor over the top to load trucks from right side if desired.

# More Coal by Augering

## How augering ups coal recovery with efficiency at Hardburly mine. New kinks and efficient planning facilitate truck haulage, storage and transfer of coal.

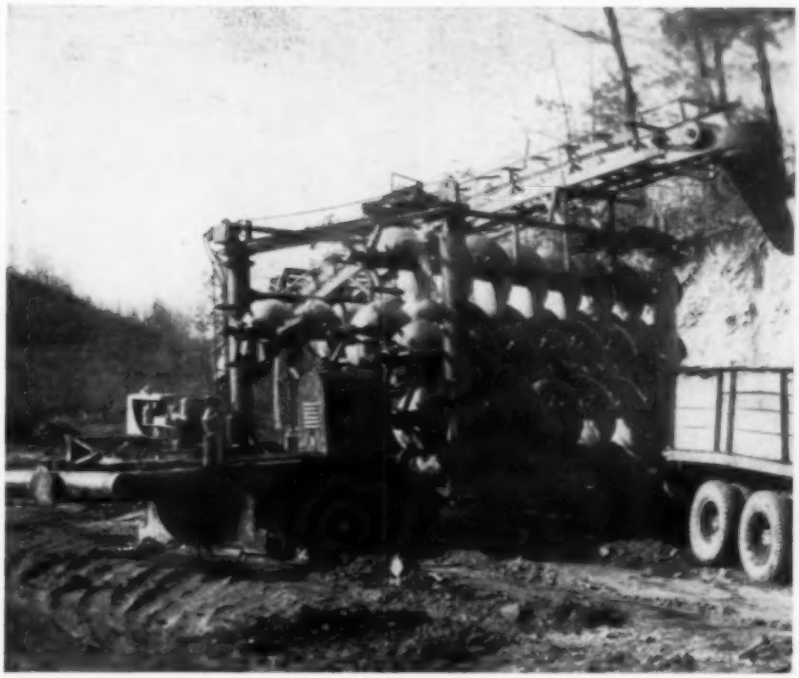
By GEORGE W. VAUGHN
General Superintendent
The Old King Mining Co.
Hardburly, Ky.

AUGER MINING at our Hardburly operation is done in conjunction with mechanical loading underground as an economical method of increasing recovery under the conditions encountered. The extent to which it has proved itself may be judged in part by the fact that auger coal is approximately 60% of the total tonnage produced.

The goal in both auger and underground operations is recovery of the Hazard No. 7 seam, an excellent steam and domestic coal. Thickness varies from 48 to 56 in. The average is 52 in. A 2-in bone parting is characteristic of the seam and occurs about 20 in above the bottom. It is disposed of by jig washing and hand-picking in the tipple. No other impurities are

**IN PREPARING BENCH** for augering, 2-yd shovel makes initial cut. Bench width is from 35 to 60 ft, depending on the slope of the hill.

Adapted from a paper presented at the 1954 meeting of the Kentucky Mining Institute



**HOW OVERHEAD CONVEYOR** makes two-way truck loading possible at Hardburly by providing additional station at right side of auger unit.

present in any considerable quantities. Immediately above the coal seam is 6 to 18 in of soft drawslate, above which is a hard sandstone of varying thickness. The bottom is soft fireclay.

An attempt was made to strip this acreage but was unsuccessful because of the sandstone roof. After investigation by the management of several auger operations it was decided that this property would lend itself to this type of mining. A Compton Model 36 unit, equipped with 42-in auger, 150-hp Cummins diesel carriage engine, and 100-hp Cummins diesel auxiliary engine, was chosen as the most suitable for this operation. The self-contained elevating conveyor, better-designed cutting head and auger sections, and the superior arrangement for handling and racking auger sections influenced the selection of this machine.

**BULLDOZER FOLLOWS** shovel (opposite page) for final spreading and leveling of augering bench. Highwall averages 18 to 20 ft high.

## BENCH PREPARATION

The augering site is prepared by facing up the coal with a 2-yd Lorain power shovel and a TD 24 dozer. Highwall height averages 18 to 20 ft. Width of the bench is from 35 to 60 ft, depending on the slope of the hill. No blasting is necessary to maintain a workable bench width, and it is much cheaper to discard, if necessary, the first 5 to 20 ft of coal drilled, rather than move the extra hard rock to go deeper into the hill. Slides too big for economical moving very often are encountered in hollows, and around most narrow points the coal is too thin to be drilled. When these conditions are encountered, a road is cut only wide enough to permit the movement of the equipment, and no attempt is made to face up the coal. Loss of this portion of the highwall to drilling contributes to a rapid advance but complicates haulage considerably.

The auger is moved by means of a D 8 bulldozer. This machine also keeps the highwall cleaned immediately ahead of the auger, keeps the road smoothed immediately behind, and pushes spoil if the shovel is not too far advanced. These cleanup operations are carried on on the first shift only.

## SCHEDULE AND CREW

Coal is augered three shifts daily, a shift being 7 hr 15 min. The auger is idle 45 min while shifts are changing and this period is used by the oncoming crew to refuel, grease, change bits and do other maintenance.

The crew for the first shift (7:00 am to 2:15 pm) consists of 1 foreman, 1 carriage operator, 1 hydraulic control operator, 2 hookmen and 1 bulldozer operator, a total of 6. On the second and third shift, only one hookman is employed, since the bulldozer operator, having no other duties except to pull the auger from one hole to the next, can also function as hookman. Hookmen attach and detach ropes from the hydraulic traveling cranes to lower the auger sections into drilling position or to remove and rack them when withdrawing from the hole. The hookmen's duties are very light, but experience has shown that speed in adding or withdrawing auger sections contributes greatly to production.

## HOW AUGERING IS DONE

Pillars 6 to 12 in thick are left between holes, depending on the firm-

**AUGER-COAL STORAGE** accommodates up to 4,000 tons. Transfer to mine cars is accomplished by dumping directly to elevator and by bulldozing the coal up when the trucks are away.

ness of the coal and the roof. Pillars cut too thin will often break into the preceding hole, resulting in the loss of the conveying action of the auger. Also, if the pillars are too thin and the highwall is not solid, it may cave in on the machine.

For drilling, the machine is pulled into position by the bulldozer as directed by the foreman. The hydraulic control operator levels the machine laterally and attempts to set it longitudinally to follow the pitch of the seam. This operation is purely trial and error but the skilled operator requires only one or two holes to find the pitch and follow it except where there are unusual rolls.

After preparations are completed, the hydraulic operator signals a truck under the loading boom and starts the conveyor. At the same time, the carriage operator starts the auger and applies pressure. While this section is being drilled, the hookmen attach the hoist ropes to another section of auger and raise it to clear the racks. Drilling a 20-ft section takes 3 to 4 min on the first five sections, and 4 to 8 min on the next three sections. After a section is drilled the hookman detaches it from the carriage, which returns to the rear of the machine to permit the next section of auger to be lowered into place and attached.

Adding a section of auger takes 20 to 50 sec. During this time the loaded truck pulls out and an empty truck takes its place. This cycle is repeated until all eight sections of the auger have been drilled, or until top or bottom is hit, the pillar breaks through into the preceding hole, or the auger cuts into underground workings. Withdrawal of each section takes about 1 min and about 3 tons of coal is recovered in withdrawal from a 160-ft hole. After withdrawal, the cutting bits are checked and replaced as needed. The machine is then ready to be pulled into position to drill the next hole.

## STOCKPILING AND LOADING

Coal is trucked to a stockpile for loading into mine cars or for storage. The loading point is equipped with a Joy elevating conveyor and a Brown-Fayro car-spotting hoist, and is set up to handle trips of 25 3½-ton mine cars. A Caterpillar D 7 dozer is used to push coal into the elevator for loading into the cars. In stocking, coal is ramped up directly in front of the loading point to permit trucks to dump as near the elevator as possible, and thus minimize pushing by the dozer with consequent grinding of the coal. The stockpile has been built up to 4,000 tons in times of good weather and slow running time at the tipple. The tipple operates 7 hr 45 min only, and usually auger coal is loaded into cars only in these hours.

When loading operations start, the dozer moves the coal directly in front of the elevator as soon as possible to permit trucks to dump directly into the elevator. While trucks are traveling the dozer continues loading, stopping only while the cars are being changed. A trip is loaded in about 20 min and 350 cars are loaded on the average shift. Coal is dumped into the stockpile any time mine cars are not available, as well as at night and days when the tipple is idle. The ability to operate the tipple from the stockpile, along with augering at night and on idle tipple days, results in an even flow of coal and has proved to be the most economical method of operation.

Each foreman makes a written report at the end of his shift, showing the number of holes drilled, their depth, lineal feet of unsalable coal discarded, number of trucks loaded and, if holes are drilled less than 160 ft, the reason for stopping. This permits a quick check on efficiency.

## AUGER PRODUCTION

The following production averages are compiled from the previously mentioned reports and cover a period from March 1 through Sept. 30, 1954.

Average tons drilled by the first shift was 402 tons per shift. The second and third shifts each averaged 366 tons. Every shift during which any coal was produced was counted as a full shift in determining these averages even though breakdowns or bad weather prevented completion.

Average daily production (three shifts) was 1,134 tons, of which 113 tons was croppy and unsalable, making the net production 1,021 tons.

Best single shift was 542 tons of salable coal.

Best three shifts was 1,498 tons of salable coal.

Average depth of holes was 88 ft.

Auger mining has some disadvantages, namely: the cost of the pit preparation, the cost of the road maintenance, and the cost of the truck haulage, all of which increase the cost of actual production. Adverse weather conditions always seriously hamper and, on occasion, stop production. Nevertheless, auger mining has proved to be highly productive under favorable conditions.

This special drill rig, designed by Anthony Schacikoski, General Superintendent of Leechburg's mining operations, makes drilling easier — takes full advantage of Kennametal roof bits and the Jeffrey drill.

# Kennametal* HFD roof bits last longer than other carbide bits at Leechburg Mining Company

At Leechburg Mining Company's Park Mine, tests were made of Kennametal HFD 1⅜-inch roof bits and other carbide bits of the same diameter. Using a Jeffrey A-7 Drill with shop-made rods and drilling rig, holes two feet deep were drilled into hard, brittle slate having a one-inch pebble streak.

Four holes were drilled with the other carbide bits under test before reconditioning was necessary. Under the same conditions, 14 holes were drilled with Kennametal before resharpening, reducing bit cost to ⅓ of what it was formerly.

Kennametal bits last longer because they're made better. They have shock and wear-resistance qualities superior to any other tungsten-carbide bits in the industry. Try them. Your bit costs will be less. You'll spend less time resharpening and changing. You'll drill more holes per man, per machine, per hour. Your Kennametal representative, a veteran having many years of mining experience, will help you put the right tool on the job. Call him, or write: KENNAMETAL INC., Mining Tool Division, Bedford, Pennsylvania.

**National Mine Service Company**

## National Mine Service appointed Kennametal dealer

Complete stocks of Kennametal mining tools are now available at all National Mine Service warehouses . . . Indiana and Forty-Fort, Pa., Beckley and Logan, W.Va., Jenkins and Madisonville, Ky. Kennametal service and sales personnel work with those of National Mine Service in giving tool performance demonstrations and reconditioning instructions and to help you in tool selection.

## A third less manpower A third more drilling

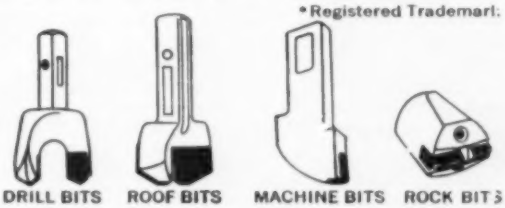
Use of the Kennametal RD 1⅝-inch bit resulted in both easier drilling and lower drilling cost in an anthracite measure at Rogers Bros. Co., Scranton, Pa. Simply by changing to this bit, two men are now drilling ⅓ more each shift than previously drilled by three men in the same length of time.

## **New**—Uranium prospector's drill

Kennametal recently introduced a carbide-tipped hand drill for uranium prospectors. This new tool stays sharp much longer than conventional drills, greatly reducing the load of drills to be carried into remote prospecting areas.

*Registered Trademark

INDUSTRY AND **KENNAMETAL** . . . *Partners in Progress*



# FOREMEN'S FORUM

## Why Read?

**These are views on reading presented by a General Electric spokesman addressing himself to American young people. But he has good advice for all, including supervisors who hope to continue their growth.**

ONE OF OUR TEACHER FRIENDS wrote us recently. Among other things his letter said, "At our school we have Shakespeare's plays on records. We can't get our boys and girls to read them anymore."

That set us to thinking. We had always assumed that everyone liked to read if only for entertainment's sake. We were sure that everyone had to read, simply to learn the things that go to make up our day-to-day lives whether it's how to run a store, or how to put up a TV antenna, or how to make an outdoor fireplace. We had thought that, sooner or later, everyone has to go to the library to look something up.

### STUDY DEPENDS ON READING

We did a little checking and found, among other things, that Michigan State College thought it necessary to tell each of its freshmen: "Since about 85% of all study activity depends on reading, it is undoubtedly your most important means of learning in college." Apparently, some boys and girls can get as far as college and still not realize the importance of reading.

We tried to imagine what it would be like at General Electric if no one did any reading. We can design a machine to operate by a record play-back that "tells" it what to do, but we don't envision a machine that can read our mail or reports.

We decided this idea wouldn't work very well. But the more we thought about it, the more we realized how important reading is. We put some of our thinking on paper. Here it is.

### WE READ TO LEARN

Everybody reads for learning or entertainment. That's not a startling statement, but it is a basic, enduring truth.

From our experience at General Electric we know how much we depend on reading. In a sense our company is like a school or college. Working at a job is a continuous process of learning. New things happen every day. New products are developed, new sales fields are opened up, better ways of doing a job are discovered. To us, reading is the most important means of learning.

Scientists in all free parts of the world exchange information because they know that co-operatively they can move along their researches faster. Salesmen need advance information about what design engineers are dreaming up. Financial men read statements about new tax policies so they can forecast their effect on company business. Employee-relations men need to know the newest thoughts on benefit plans and retirement age. Plant managers must keep up with their company's policy.

Most of this information is obtained by reading and by digesting what has been read. It's no good to be off base a yard when a printed message is taking the place of oral instruction.

This is reading for learning—not entertainment—but the fact is that many men find themselves so interested in the things they have to read that they forget the whodunit or adventure story they might otherwise have picked up.

### "PULL" WON'T GET YOU BY

Industry, to survive today, is quite aware that performance is the criterion of the individual's worth. Never in the history of industry has "marrying the boss' daughter" been of so little value as it is now. Or belonging to the right lodge or golf club.

To build a hard-hitting team, industry places responsibility upon key personnel. The men and women of this group are moving constantly toward more exacting (and exciting) positions. These are the people—believe us!—who can read and speak and write concisely, clearly, interestingly. Absorption of knowledge through reading comes first.

### A WAY OF SELF-EDUCATION

We were talking in the office the other noon about the late A. R. Smith. A few of us remembered him vaguely as a man who wore a black derby and who was one of the world's foremost steam-turbine authorities. Unlike most of his fellow engineers, he had no college education. His "college" was a course of study with a correspondence school. For him, 100% of his study activity depended on reading.

We believe that men of narrow learning do not have the understanding to bring along their successors. In fact, without a grasp of their company's purposes and obligations, they cannot understand its place in the vast pattern of national life. A man's mind is his eyes to see ahead.

We think you will confirm the following belief. Reading is variety itself. No one author, no one magazine's editorial staff has a corner on interpretation or final truth. All ideas are in transition especially in America, and by wide reading you are having the fun of accepting and rejecting and putting two and two together. You experience the luxury of becoming a thinker instead of a yes man. Such were the industrial pioneers 100 yr ago who read in one of our most important technical magazines that there wasn't much of a future for electricity, yet who went ahead to establish the electrical age.

### GETTING "IN THE KNOW"

Another real dividend paid the reading man is his growing ability to take part in business or social discussion. Although the purpose of reading is not to show off in conversation, the reader is "in the know" and can listen wisely and speak his own piece to advantage. Often the strong, silent man—on the other hand—is still water running not very deep.

If we want to know, in our spare time, how to bind a book, how to identify evergreen trees, how to mix up and bake a cheese cake, how to build a summer home, we go to the library.

Whether we are technical or business men, we are eager to keep up with published knowledge on many subjects: new alloys for jet engines, legislation on taxes, color television, social security—the list is endless. We are so close to the challenging demands of these years of technical progress and worldly unrest that we must keep our minds in high gear.

### VALUE OF SOUND PREPARATION

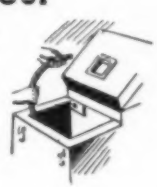
Yet we are aware that there are people who can't be communicated to, except through the medium of pictures. If we sound cranky, it is because we ourselves are not immortal; we just want to make sure that every high-school boy and girl in America, who will move into our positions, will be prepared to absorb our

Adapted from an article in the November, 1954, issue of the *General Electric Review*.



contributions, build on them, and thereby

## Cold Test



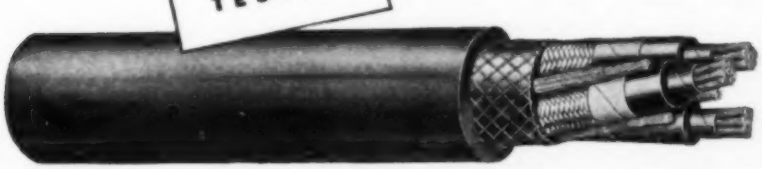
Exposure to sub-Arctic temperature is one of the ordeals these cables must undergo to prove their qualifications. The cables are conditioned for one week at –70° F. and, while at this temperature, bent around a mandrel having a diameter three times that of the cable for cables .55" and less in diameter. Larger cables are bent to greater diameters. This is one of the most severe ways of testing U. S. Royals.

# U. S. ROYAL CABLES ARE COLD RESISTANT

**7 reasons why U. S. Royal Cables mean safety:**

Seven grueling laboratory tests, each of them tougher than actual conditions, guarantee U. S. Royal's resistance to moisture, abrasion, cutting, heat, cold, impact, flexing. United States Rubber engineers spare no effort in making sure U. S. Royal is a completely safe electrical cable. Write for your free copy of valuable booklet on mining cables to address below.

SAFETY TESTED



U. S. Royal Shielded Portable Cable Type SH-D

US RUBBER

**UNITED STATES RUBBER COMPANY**

ELECTRICAL WIRE AND CABLE DEPARTMENT • ROCKEFELLER CENTER, NEW YORK 20, NEW YORK

contributions, build on them, and thereby keep our American system intact.

In the flood of school and college graduates coming to industry for jobs, we are not looking for bookworms. We don't want you to stick up your noses at the tribulations of the Dodgers, do-it-yourself, and the other non-reading pursuits that make for a happy, human life; but—what do you know?

### READ WORTHWHILE THINGS

Do you know your American history? If you know that a communal economic system was established in the early years at both Plymouth Colony and Jamestown, do you know why that system burst at the seams? Was Florida one of the 13 original colonies? Are you a little ashamed of your brother American when he can't give a TV quizmaster the name of a single member of the President's cabinet? Don't put down the empty look on the victim's face solely as stage-fright!

Ignorance is the father of apathy. If you expect to love the children that will be yours tomorrow, you had better heed a statement like this: "In a world that has seen Socialism, in some degree, spread throughout nearly all the major nations, America cannot permit her young people to take their blessings for granted and become indifferent to how those blessings have been made possible. The indifference or apathy that stems from ignorance causes young people to have little if any interest in defending our basic American principles which are under attack."

The leaders of peoples who would destroy us tell the masses to read—the party line. Here, we are free to read even the words, the arguments of our enemies. In fact, in America, the book or pamphlet your local library does not have is still obtainable; your librarian knows how to bring you almost any book cataloged in any library anywhere.

Why are there adults living in these exciting times who are uninformed about things that affect all our lives? Mainly, they do not read.

Why are there still a few young Americans in our schools who do not know the score? Same answer.

Is reading a bitter medicine that you have to get used to? You answer that one. We are prejudiced!

### "WE ARE WHAT WE READ"

Why read? Almost all that is worth knowing is in words. It takes an easy familiarity with reading and a tremendous appetite for recorded knowledge—past and present—to keep in step with these fast-moving times.

Our high-school English teacher used to say to us: "We are what we read." Later, an annoyed college instructor said, as we struggled over a long passage: "It's painfully true that the way not to become a fathead is to fatten the mind."

These were hard words, but in them was an elementary truth: if you liken your mind to a container, it is the only one we know of that the more you cram into it the more it can hold.

## Ten Resolutions for Supervisors for 1955 . . .

**1. RESOLVED, that I shall put safety above everything** else in my thoughts as I approach each day's work.

**2. RESOLVED, that I shall not condone** poor workmanship merely to avoid the trouble of making corrections.

**3. RESOLVED, that I shall do my best** to increase my technical knowledge and supervisory skill through study and observation.

**4. RESOLVED, that I shall give** my superior the co-operation I would like to have if I were in his place.

**5. RESOLVED, that I shall never mention** the name of my cross-shift supervisor as an alibi for a poor shift.

**6. RESOLVED, that I shall respect** the opinions and suggestions of my fellow-workers, rate their merit without prejudice and assign credit where it belongs (even though I could kick myself for not having thought of it first).

**7. RESOLVED, that I shall not tolerate** practical jokers on the job.

**8. RESOLVED, that I shall know** at all times that the roof in my section is safe because I will see that it is properly supported.

**9. RESOLVED, that I shall take charge** of my section this year by leading, not pushing.

**10. RESOLVED, that I shall set interim goals** for myself in the various phases of my job, and upon reaching any of these goals I shall raise my sights a bit higher.

## *The Real Values in Good Ideas . . .*

THE INFLUENCE OF A GOOD IDEA usually spreads far beyond the visible benefits which are readily apparent. Take roof bolting, for example. Anyone can see the safety advantages which result from this good idea, but we are just now getting some insight into the corollary benefits it brings.

Did you know that the coal mines of the United States now are using almost 2 million roof bolts every month?

Think of the number of men gainfully employed in the processes of making, distributing and installing this staggering total of roof supports. The production of a large number of coal miners is required to make the coke used in the manufacture of steel for these bolts. Iron-ore miners and limestone producers also benefit from this relatively new market for steel. The services of a large number of other men are required to fashion the raw steel into bolts, to manufacture other necessary items such as expansion shells, shin plasters and so on, and to package, transport and otherwise handle these 2 million items.

Hundreds of men underground devote their total time and energy to installing the bolts. And a whole new equipment industry has sprung up to provide the special drills, rock bits in quantity, dust collectors and bolt-testing devices which are necessary to insure efficient installation.

Here is an idea, born and matured within the past few years, which provides distinct benefits to people who will never know what it is like to work under mine roof made safe by the product of their efforts.

Now within this big idea there is room for the development of still other ideas. There is room for much good thinking on the problems of improved dust collection, better testing equipment, the pros and cons of bolt recovery and re-use, and more efficient installation. Then, too, the problem of finding gainful employment for numbers of timbermen and suppliers of mine timber will be a cause for concern. New ideas have wide-reaching side effects.

But the nub of the matter is that we still pay off handsomely on good ideas. The rapid development and widespread acceptance of roof bolting prove once again that there is something new under the sun. We still have frontiers to intrigue us.

# for lower cost control of moderately **Corrosive** fluids

Fig. 2651-A Gate

**JENKINS**

## NICKEL IRON

**Valves with Type 316**

## STAINLESS STEEL

**Trim**

Fig. 2624 Swing Check



This combination provides corrosion resistance well above the moderate need in many processing services with an investment well below that for all-stainless steel valves.

Designed primarily for the chemical process industries, they are recommended for control of mildly corrosive liquids with minimum quantities of mineral acids, such as creosote in wood treatment, and many liquids carried in petroleum processing.

A major use is in pulp and paper processing, particularly in lines serving the digester, and in the chemical recovery cycle. Service records in lines carrying the valve-punishing "black liquor" give Jenkins Nickel Iron Valves top performance rating.

Jenkins *extra value* construction throughout. Get details — compare. See why they stretch your valve investment dollar — with longer service life, lower maintenance cost.

ALSO RECOMMENDED for fluids used in electroplating, photograph finishing, textile bleaching, dyeing and finishing and heat treating of metals.

**GET COMPLETE SPECIFICATIONS from your Jenkins Valve Distributor, or write: Jenkins Bros., 100 Park Ave., New York 17. Ask for Bulletin 118.**

***Every part in contact with fluid is the right metal to block corrosion and beat wear.***

**Cast NICKEL IRON**

- **BODIES** Heavy duty, dimensioned for greater resistance to wear and abuse. Through port design in Gate Valves.
- **BONNET** Rugged construction, like body. Swing-type gland bolts. Screwed-in back-seating bushing. Deep stuffing box.
- **YOKE** Integral with bonnet in 2″ to 4″ sizes.
- **WEDGE** In 10″ to 24″ sizes, with Stainless Steel Wedge Rings.
- **COVER** In Check Valve.

**Type 316 STAINLESS STEEL**

- SPINDLE
- GLAND
- BONNET BUSHING
- SPINDLE RING
- WEDGE PIN
- WEDGE RINGS Rolled into Nickel Iron Wedge in 10″ to 24″ sizes.
- SEAT RINGS
- DISC and HANGER in Check Valve

**NI-RESIST Type No. 2**

- WEDGE of I-beam structure is solid NI-RESIST in 2″ to 8″ sizes.

**PRESSURE RATINGS**

2″ to 12″—200 lbs. O.W.G.
14″ to 24″—150 lbs. O.W.G.

# JENKINS VALVES

LOOK FOR THE DIAMOND MARK

SINCE 1864 TRADE JENKINS MARK

Jenkins Bros

# OPERATING IDEAS

## Reflector Tape Shows Switch Position 300 Ft Away

TO BE EFFECTIVE, a good idea doesn't have to be earth-shaking, nor does it have to always solve a problem of major proportions. As the old saying goes, "It's the little things in life that count."

A case in point is the addition of reflector tape to underground switch throws at Truax-Traer Coal Co., West Virginia Div., Kayford, W. Va., to warn motormen and brakemen of the switch position. The tape can be seen 200 to 300 ft away, which permits ample time to stop the motor if needed.

The idea was originated by Arvel B. Cochran, mainline motorman. As put by one company official, the system has meant a real saving of time by eliminating countless stops by the motor. In addition, it has proved an important factor in accident prevention by warning the motor crew in advance that a careless person has not thrown the switch properly. In the accompanying photo taken in Shamrock No. 1 mine, Mack Mullens, night foreman, points out the position of the reflector tape.

## Tractor-Loader Doubles as Hoist for Awkward Loads

A DASH OF INGENUITY often makes a versatile unit even more valuable. A case in point is the addition of a pair of large hooks to a Traxcavator bucket, as shown in the accompanying illustrations. This unit, in service at a Pennsylvania anthracite operation, not only loads bulk materials into trucks, but also lifts and transports some unusual loads.

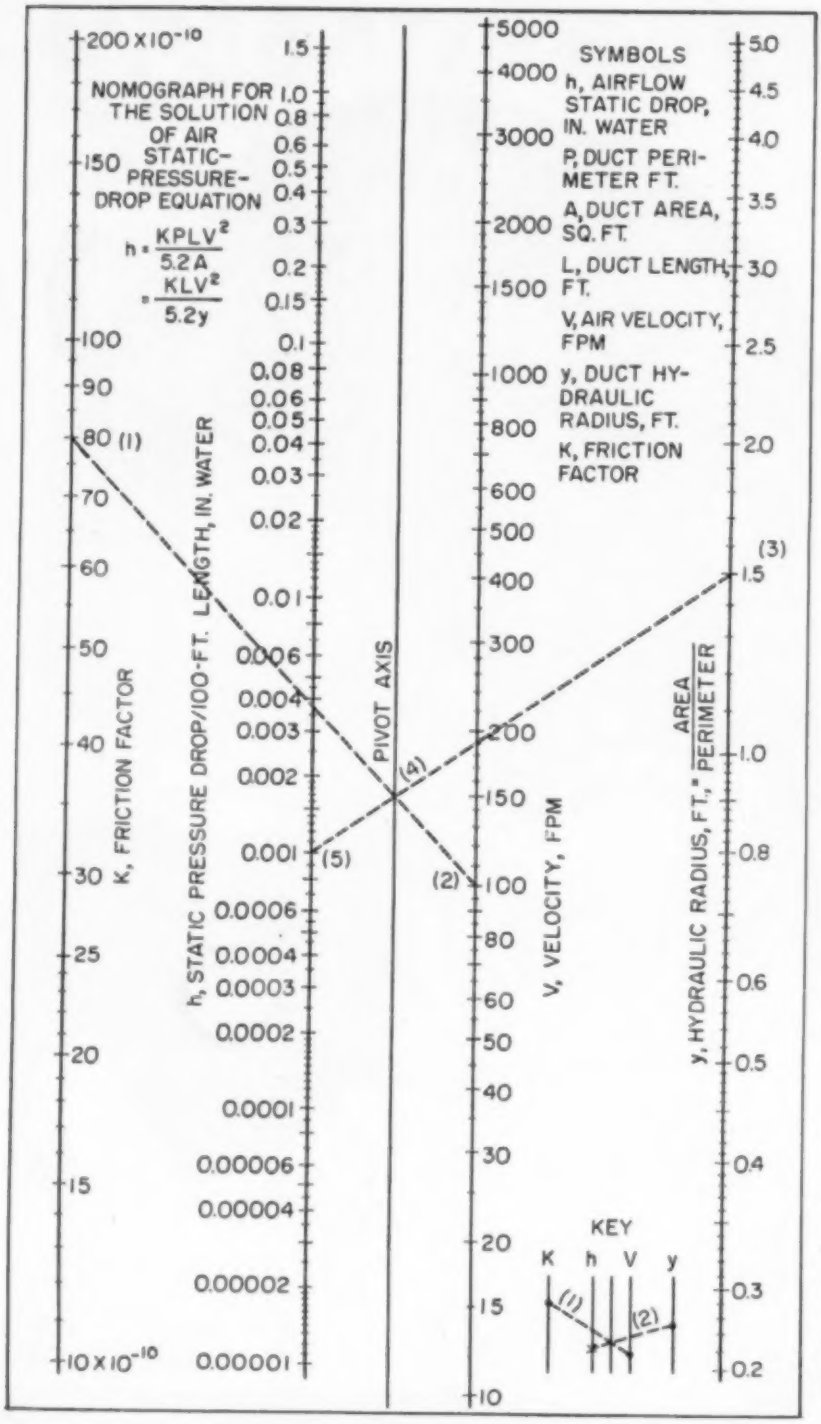
By making use of chains in conjunction with the welded-on hooks, the operator is able to lift and move a steel beam by securing one end of the beam to the bucket, as shown. Or he can lift and spot mine cars, lay rails and perform a number of other such duties.

***More "Operating Ideas"***
***On pp 75 and 94***

**. . . HOW ABOUT YOURS? *Coal Age* has a standing offer of $10 or more for each "Idea" acceptable for publication. If you've developed one that worked successfully at your operation, why not tell us about it? Just describe it in your own words, enclose a free-hand sketch if needed and a photo if you have one. Write: The Editor, *Coal Age*, 330 W. 42nd St., New York 36, N. Y.**

# How to Quickly Determine Static Pressure Drop

By Dr. HOWARD L. HARTMAN
University of Minnesota
Institute of Technology
Minneapolis, Minn.




## How To Use Nomograph

**Given the following:** $K = 80 \times 10^{-10}$; $V = 100$ fpm; $y = 1.5$; $L = 3000$ ft. Determine h, drop per 100 ft in inches of water.

**Procedure:**

(1) Place rule on 80 on the K scale at left.

(2) Also on 100 on the V scale at right center, and draw line intersecting pivot axis, center.

(3) Place rule on 1.5 on the y scale at right.

(4) Also on pivot axis, center, and draw line to intersect h scale, left of center.

(5) Read answer .00103 at final point of intersection.

IN MINE VENTILATION WORK, no calculation is performed more frequently or ardously than the one for static pressure drop of airflow through mine openings. The fundamental friction loss formula which must be employed is usually expressed

$$h = \frac{KPLV^2}{5.2A}$$

where h: air static pressure drop, in. water,

P: airway perimeter, ft,

L: airway length, ft,

A: airway area, sq ft,

V: air velocity, ft per min,

K: friction factor

Charts are available which permit a graphical determination of pressure drop when ventilation piping or tubing is employed. However, these charts are not satisfactory when the general problem of airflow in mine openings is faced because of non-circularity of the airways and variances in friction factor.

A nomograph is presented here that overcomes these difficulties in solving the fundamental formula for airways of any shape or friction factor. If hydraulic radius, y, which equals area divided by perimeter, is substituted in the fundamental formula, the equation becomes

$$h = \frac{KLV^2}{5.2y}$$

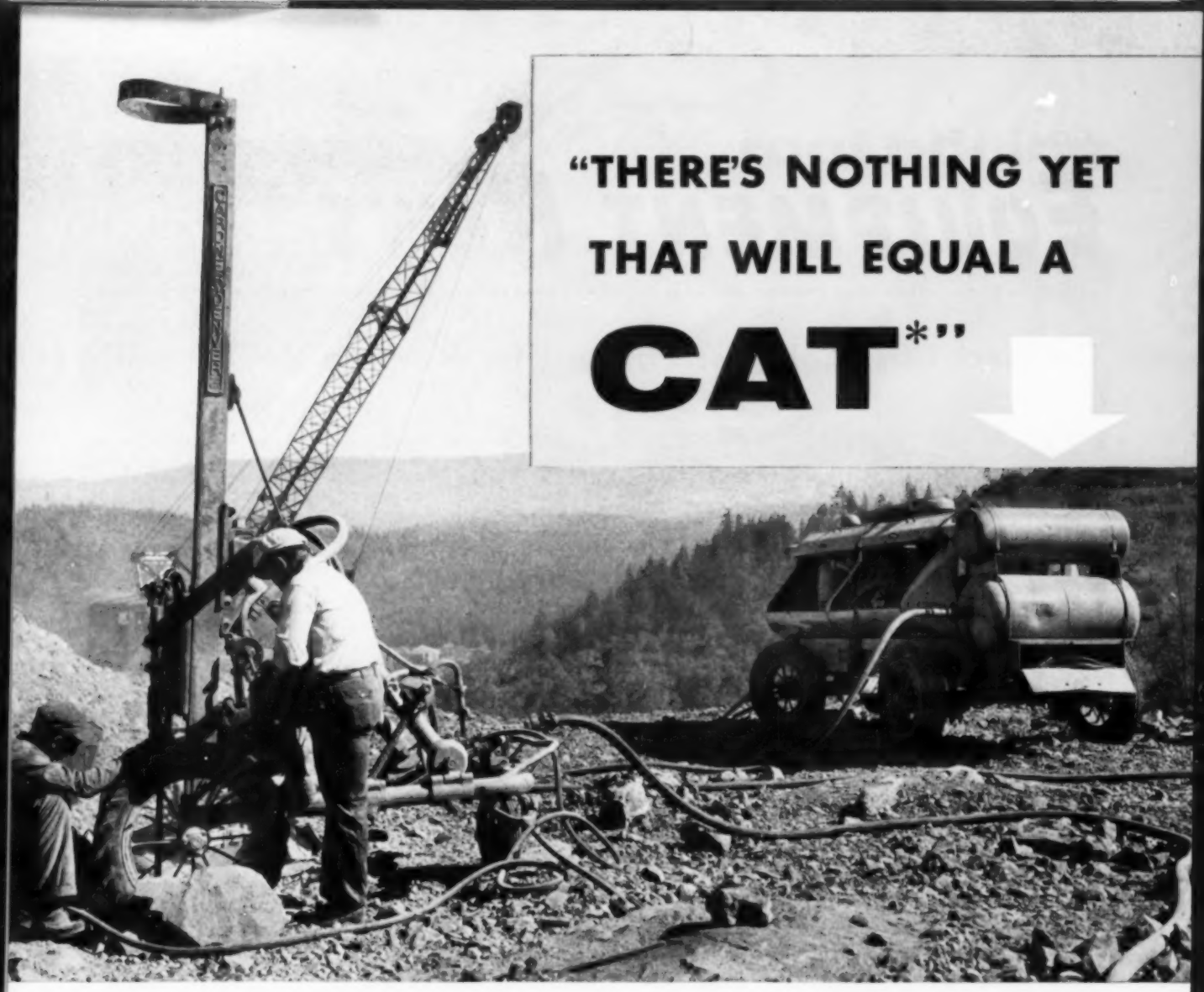
This revised formula is the basis for the accompanying graph.

In using the pressure drop nomograph when the airflow and airway characteristics are known, hydraulic radius is first computed or read from the table below and the friction factor is selected from experience or a table.[1] These values are connected by straightedge on the nomograph, following the procedure outlined in the key. The static drop is then read directly in in. water, per 100-ft length of airway.

The accuracy obtained with this nomograph (1 or 2%) warrants its use in all routine ventilation work and as a check for precise survey measurements and calculations.



[1] McElroy, G. E., Engineering factors in the ventilation of metal mines, USBM Bull. 385, p 43, 1935.



# "THERE'S NOTHING YET THAT WILL EQUAL A CAT*"

Up in Ravensdale, Wash., this Gardner-Denver 500-foot compressor furnishes air for drilling hard clay overburden which is then blasted to get at the coal seam. On the job since 1950, its rugged Caterpillar D13000 Engine has never been overhauled!

Performance records like this are not unusual for Caterpillar Engines. Nor are comments like this one from Al DeCoria, job superintendent for J. A. Terteling & Sons, Inc.: "There's nothing yet that will equal a Cat."

On tough jobs like this one, the rugged construction and quality workmanship of Caterpillar products pay off. Such features as specially hardened crankshaft journals, long-lived aluminum alloy bearings and really *effective* engine filters and seals contribute to long and trouble-free work life.

Routine maintenance on Caterpillar Diesels is simple and easy. And, to cut costly down time, your Caterpillar Dealer stands ready with factory-trained service men and genuine Caterpillar replacement parts. Further cutting costs is the ability of all Cat Diesels to deliver full and foul-free power on non-premium No. 2 furnace oil, thanks to their exclusive Caterpillar-built fuel injection systems. This means a three-way saving: cheaper fuel, less fuel, reduced maintenance.

Leading manufacturers of excavators, compressors and other mining machinery can supply Caterpillar Engines in their equipment. And you can get replacement power from your Caterpillar Dealer. He will be glad to help you select the right size unit from Caterpillar's range of diesel engines and electric sets.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

**CATERPILLAR***

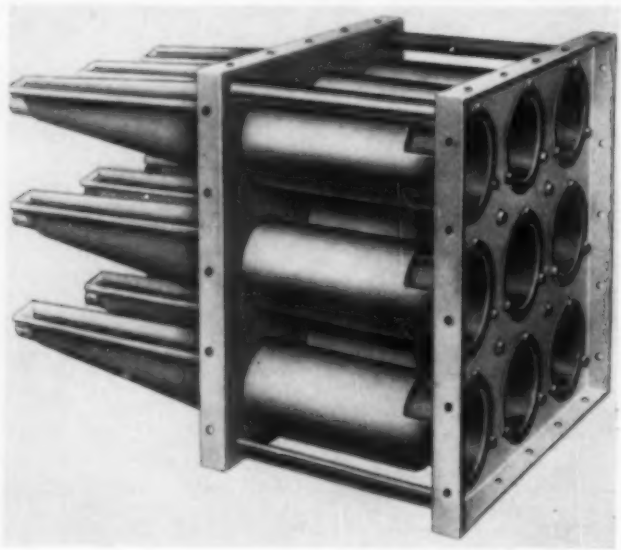
*Both Cat and Caterpillar are registered trademarks—®

**SPECIFY CAT POWER FOR HIGH-PROFIT PERFORMANCE**

COAL AGE

# EQUIPMENT NEWS

## Compact Dust Collector Efficient for Varying Volumes (1)



An outside-in twist that reverses the normal tangential flow of most centrifugal dust collectors is credited with giving its compact new "AMERclone" dry granular dust collector high efficiency over a wide range of air volumes, according to the Dust Control Div., American Air Filter Co., Inc., Louisville 8, Ky. Heart of the development is a conical inlet which imparts a swirling motion to dust particles, while permitting clean air to travel through the Type G AMERclone tube without changing direction. Each tube has an approach velocity of 1,000 fpm and a cleaning capacity of 333 fpm. Nine AMERclone tubes are combined in a standard modular cell, which has a nominal rating of 3,000 cfm with a face area of only 20x20 in. Any number of the modular cells may be combined to achieve required capacity within available space. Because of this simplified "straight-through" air-flow design, the AMERclone units can handle widely fluctuating air volumes and dust concentrations with almost constant efficiency, it is said. The basic AMERclone unit includes a secondary exhauster circuit which provides for disposal of the 10% of the primary air, and collected dust, bled off by the AMERclone tubes. Because each tube has two to three times the rated capacity of conventional collectors of comparable size, the unit offers material space savings. Bulletin 291 with details from company.

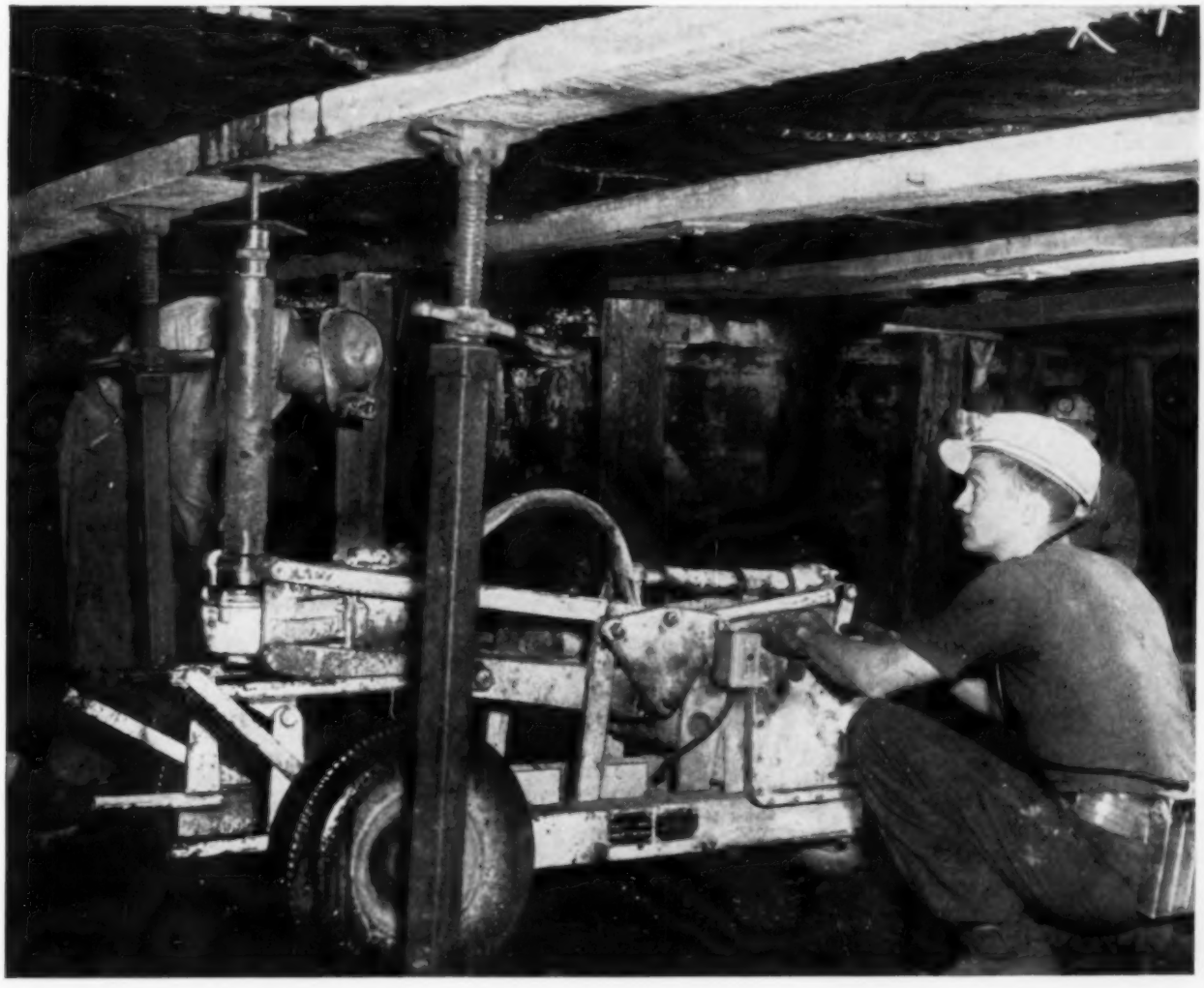
## Front-End Loader With 4-Yd Bucket (2)

Development of a large front-end loader weighing 47,820 lb has been announced by Mixermobile Manufacturers, 8027 N. E. Killingsworth, Portland, Ore. Designated the LD20, the giant machine is available with a 4-cu yd bucket for conventional loading tasks. Lifting capacity of the hydraulic boom is about 18,000 lb and bucket discharge height is 14 ft. The new unit features four-wheel planetary drive, four-wheel power steering, full hydraulic operation and Mixermobile's exclusive Pow-R-Flex coupling of two separate power axle elements permitting the individual axles to oscillate up to 15 in. with constant, positive driving power on all four wheels at any degree of turn, twist or oscillation. The machine is powered by a heavy-duty diesel engine, with Twin Disc torque converter, power divider and three-speed transmission, and has a top speed of 16 mph. It is also available with a 10-yd bucket for handling light materials, as shown here with a 1-yd unit for comparison.

## Faster Operation Features of New ½- and ¾-Yd Shovels (3)

Its "Speed-o-Matic" controls are available for the first time on heavy-duty ¾-yd machines with introduction of the LS-88 shovel-crane, reports the Link-Belt Speeder Corp., Cedar Rapids, Iowa. With power-hydraulic Speed-o-Matic controls, all load-handling and machine movements are smooth, safe, fast and precise, the company says. The movement of short-throw levers meters pressure for full control of power for all machine functions to assure extra speed and minimize end-of-shift operator letdown as well, with increased production up to 25% or more resulting, it reports. Because of its all-welded stress-relieved construction, the new LS-88 design emphasizes

# sure way to *faster* roof bolting



When the Chicago Pneumatic RBD-30 Permissible Roof Bolting Unit is moved into a seam it really gets to work fast! Its low 28″ over-all height permits easy entrance and affords effortless operation in low headroom areas. The telescopic chuck permits 10″ auger adjustments to speedily conform to variable roof heights.

And without repositioning it completes an entire cycle from drilling hole to setting expansion bolt in 3 minutes time. But in cases where hole depth is less than 36″, installation can be made in 1½ minutes flat! Built-in slip clutches protect the drill and bolt-setting motor . . . prevent feed motor from stalling. One rugged motor drives both auger and bolt setter. Available with these accessories: water swivel attachment, special low speed spindle adapter for slow speed drilling, and a low seam drilling attachment for low coal areas.

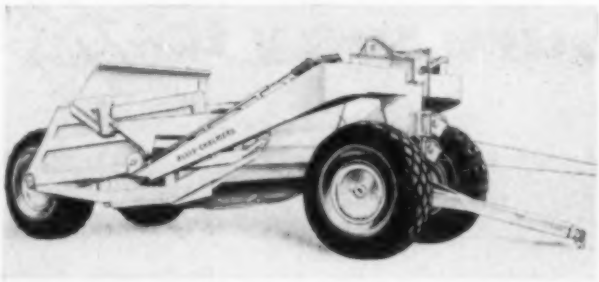
**Chicago Pneumatic** *8 East 44th Street, New York 17, N. Y.*

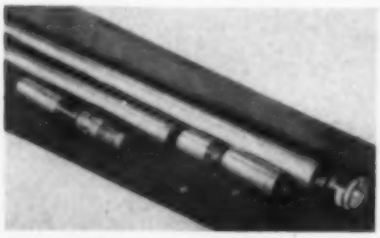
PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

more "live" or earning weight in greater proportion to counterweight found on other rigs, it is pointed out, and this greater strength advantage permits use of up to 91 net, or usable, horsepower. Introduction of a new LS-58 ½-yd machine with "big rig features" also has been announced by Link-Belt Speeder. As in other new Link-Belt Speeder units, basic key to the greater productive capacity of the LS-58 is its power hydraulic "Speed-o-Matic" controls, the company says. Upper machinery on the LS-58 is built to handle the faster operating cycles of Speed-o-Matic control and up to 55 net usable horsepower. Bulletins on both units from the company.

## New 19-Yd Pull-Type Scraper (4)

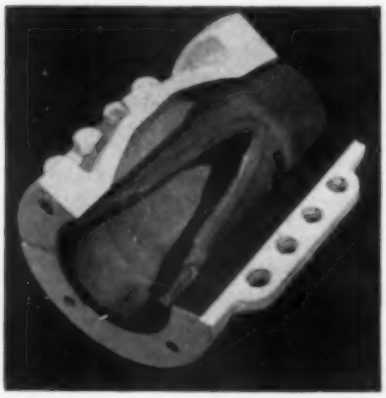
Allis-Chalmers Mfg. Co., Tractor Div., Milwaukee 1, Wis., has added a 15-cu yd struck, 10-yd heaped-capacity rubber-tired four-wheel scraper to its line of pull-type scrapers. The new unit is cable-controlled and features positive forced ejection. It provides a cut 9 ft 8 in wide, with a carbon-steel heat-treated offset-type cutting edge. Over-all length of Model 315 is 33 ft 5 in and width is 11 ft 6¾ in. Over-all height is 8 ft 8 in with blade on the ground, and 9 ft 2 in with bowl raised. Rear bowl ground clearance is 20½ in, and front axle clearance 29 in when 21.00x24 tires (standard for the 315) are used. Details from Allis-Chalmers.





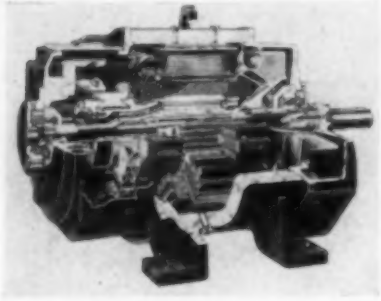
### MORE EFFICIENT CORE BARREL (5)

Developed to meet the demand of the newer, more powerful air-drilling rigs for sturdy heavy-duty equipment, the new Beaver core barrel is said by the maker to be the only barrel of its kind for coring coal. Featuring precision-machined parts that assure better cores and increase bit life, the Beaver barrel has an exceptionally heavy outer barrel that keeps maintenance costs down and promotes easy core removal on tough drilling jobs with large-horsepower rigs. Detailed information and prices from Hoffman Bros. Drilling Co., Tiona St., Punxsutawney, Pa.



### CONTROL VALVE FOR SOLIDS (6)

A new type of control valve for handling products and slurries, such as, coal, sand, etc., has an inner sleeve made of pure gum rubber with reinforced mutiply cords and will withstand abrasive wear because of the resilient characteristics of rubber. The valve body is cast iron. The Red Jacket valve can be operated either manually or pneumatically for on-off service or as a control valve. Air is put directly in the annular space between the rubber sleeve and the valve body to close the valve. It is available in sizes ranging from 1 to 24 in. Bulletin with details from the Red Jacket Co., Inc., Investment Bldg., Pittsburgh 22, Pa.



### NEW DC MOTOR LINE OFFERS FAST RESPONSE (7)

A complete new Super "T" line of industrial DC motors has been introduced by the Reliance Electric & Engineering Co., 1088 Ivanhoe Rd., Cleveland 10, Ohio. The controlled reaction of motors to the demand for a change with a "Dynamic Response" formerly found only in specially designed machines is the everyday standard of performance of the new Reliance Super "T" motors, providing the fastest and most accurate response ever offered in a standard design motor, the company says. Design features of ruggedness, ability to take full load and overloads, ability to change speed rapidly, ability to maintain torque and tension, and reverse and stop quickly are among those cited by the maker. The Super "T" will accelerate to full speed in half the time formerly required, and lower mechanical inertia, lower electrical inertia and higher commutating ability have been combined to achieve a new high in motor performance, it is said. Super "T" Motors are being produced in the sizes from 20 to 100 hp., with various enclosures, and the size range will be extended both upward and downward. Bulletin C-2002 from Reliance.

### SOLIDS PUMP UTILIZES NEW OPERATING PRINCIPLE (8)

Pumping of anything from live fish to ready-mixed concrete has proved possible in test installations of its completely new type of pump, according to Western Machinery Co., 760 Folsom St., San Francisco 7, Calif. Available in sizes from 2 to 10 in for pumping a wide range of abrasive, waste and other materials, the new Wemco "Torque-Flow" solids pump operates on a completely unique materials-moving principle, the maker points out. Its impeller is similar to an automobile fluid drive, and though entirely out of the material flow pattern, it induces a vortex (swirl) that does the pumping. The rotating fluid mass forms a buffer between the impeller and the solid particles and chunks in the flow, so that few of them ever touch. Under all conditions, impeller wear may be reduced by many times as compared to conventionally designed pumps and there is no clogging because the interior of the pump offers no restriction to flow. Bulletin SP-10 gives details.

### RUBBER HOSE OUTWEARS STEEL, HANDLES 8-IN LUMPS (9)

A new rubber hose, fortified with a "stomach" made of the toughest abrasion-resisting rubber known, swallows 10-lb chucks of iron ore and coal without wincing and will carry heavy chunks up to 8 in in length in a stream of water at pressures as high as 250 psi, according to the B. F. Goodrich Co., Akron, Ohio. Designed primarily for use in the mining industry, the new "Convertapipe" hose

# B.F.Goodrich


## Tires carry 40 tons of coal over 25,000 miles of rocks—ready for more

ONE of the world's largest strip mines is operated by the United Electric Coal Companies at DuQuoin, Illinois. Here fleets of trucks carry 40-ton loads of coal from rock-strewn pits over long haul roads made of abrasive slate. Tires could be chewed to pieces quickly, running up huge maintenance costs, running down production.

United avoids these problems with B. F. Goodrich tires, reports they have averaged 25,000 miles already with less than half their service life gone!

### All-Nylon cord body

Universal tires can take this kind of punishment because they're now built with an *all-nylon* cord body (size 12.00 and larger, smaller sizes in rayon or nylon). Nylon is stronger than ordinary cord materials, can withstand double the impact and resist flex breaks.

Under the tread is the patented B. F. Goodrich nylon shock shield. Layers of strong nylon cords stretch together to absorb shocks and protect the tire body. Universal tires wear longer; more tires can be recapped. You pay nothing extra for this nylon shock shield.

See your B. F. Goodrich representative today and find out how you can get longer tire service at lower cost in your mine work. The address is listed under Tires in the Yellow Pages of your phone book. Or write *The B. F. Goodrich Company, Tire & Equipment Division, Akron 18, Ohio.*

**Specify B. F. Goodrich tires when ordering new equipment**

**UNIVERSAL TREAD** resists rock cuts and bruises. Wedge-shaped cleats defy slippage, pull in either direction.

**OVER-ALL VIEW** of the giant DuQuoin mine. It's one of 6 operated by United in Illinois and Kentucky.

RESEARCH KEEPS B.F.Goodrich FIRST IN RUBBER

utilizes a special rubber compound called Armorite, said to outwear steel 20-to-1 in many applications. For abrasive materials, the new hose may be used to advantage wherever the pipe system must turn a corner or negotiate a bend, since short lengths flex easily around corners, thus eliminating the need for curved pipe, and the hose can be rotated to distribute the wear at these points. The new hose is available in sizes of 1 to 14 in for working pressures from 50 to 250 psi and is reinforced by an interior spiral wire to prevent kinking, crushing and collapsing.

## DC BRAKING CONTROLLER FEATURES COMPACTNESS (10)

New compact Westinghouse DC braking controller no larger than a combination linestarter is available in two sizes of enclosures for braking standard induction motors from ¼ to 25 hp, and will provide braking torques of as much as eight times full-load running torque, the maker says. Operated from a single start-stop push button, the new controller requires no adjustment after initial installation. Its main components are a selenium rectifier, contactors, transformer and a timing circuit. The new DC braking controller is expected to find a wide range of applications in general industry and particularly on machine tools and conveyors, the company says. Further information from Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

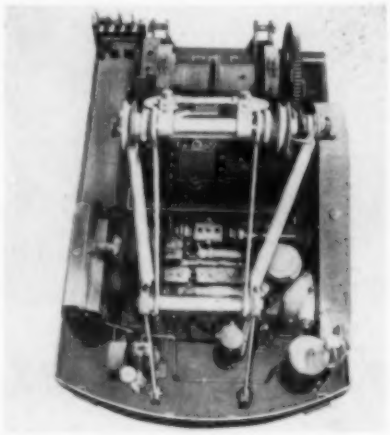
## IMPROVED TRACTOR-SHOVEL HAS TORQUE CONVERTER (11)

Improved Model HFC "Payloader" tractor-shovel with bucket capacity of 1-cu yd payload and ¾-yd struck load is a rear-wheel-drive model featuring a combination of a special new Hough-built transmission, plus torque-converter drive. Advantages of the torque converter cited by the company include a substantial reduction in gear-shifting and "clutching," less driver concentration and effort output for faster work cycles, reduced maintenance and increased Payloader life. The special new Hough-built transmission is of the full-reversing type, giving four speeds forward and four reverse up to 28 mph. Full information on the Model HFC or the other six Payloaders from the Frank G. Hough Co., 735 Seventh St., Libertyville, Ill.

## PNEUMATIC SUMP PUMP (12)

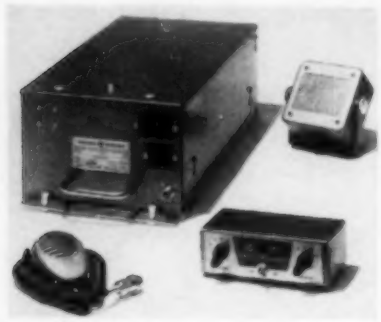
The Schramm pneumatic sump pump is designed with exceptionally large capacity so that dewatering can be quickly accomplished. Features of the pneumatic pump for dewatering service cited by the

company include immersion in water without priming; operation by any 105- or 125-cfm compressor, usually already on the job or readily available; and small size and light weight that makes it easily transported and stored. The Schramm sump pump also will handle mud and raw sewage. Bulletin with details from Schramm, Inc., West Chester, Pa.



## NEW 2-YD SHOVEL-CRANE (13)

The new Marion 83-M all-purpose excavating machine with special features designed to make it a 60-ton special lifting crane has been announced by the Marion Power Shovel Co., Marion, Ohio. As a 2-yd shovel, the 83-M was designed for construction, quarrying and mining, but can be easily converted in the field to a dragline, clamshell, pull shovel or crane, and offers both heavy-duty construction and special design features for crane service, the maker reports. All 83-M models have a torque converter as standard equipment, and other features cited by the company include new self-cooling swing clutches designed to virtually eliminate heat damage to the expanding rubber tube of the clutch; ball or roller bearings at all principal friction points and major gear housings enclosed in an oil bath; Marion air control requiring only 12-lb hand pressure by the operator on compensating-type air control valves to release full machine power; and heavy-duty design and construction. The 83-M has only two horizontal shafts on the machinery deck and only 16 gears in the entire machine, aside from front-end equipment. All units can be easily reached for maintenance and adjustment, as illustrated, and lubrication fittings are grouped and located for ease of lubricating remote points.



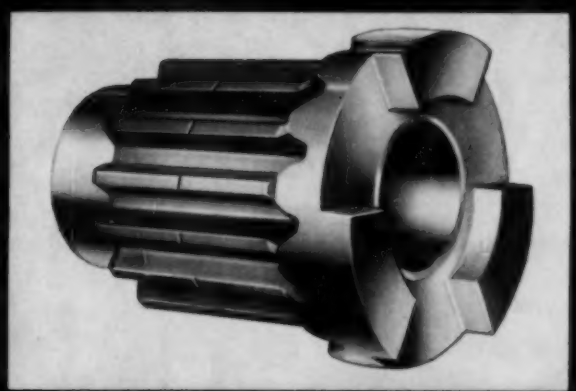
## NEW MOBILE TWO-WAY RADIO (14)

New 25-w mobile two-way radio combination transmitter-receiver announced by the General Electric Co., Electronics Park, Syracuse, N. Y., operates in the 152-174-mg band and is designed to work from either a 6- or a 12-v battery, interchangeably. Since conversion to or from either voltage is simply accomplished, the new radios are expected to be most useful for fleet operators and industrial concerns who use both 6- and 12-v vehicles. Because of its compact size, the new 25-w two-way radio may be mounted on the dashboard by the simple addition of direct controls on the unit itself.

## TRUCK HOISTS OFFER GREATER LEGAL PAYLOADS (15)

Three new Heil telescopic hoists and weight-saving bodies are now offered by The Heil Co., Milwaukee 1,. Wis., to make greater legal payloads possible in the 21- to 30-ton-capacity class. The new Heil hoists may be mounted inside or outside the chassis frame rails to fit any make of tandem truck or semi-trailer, and have the lowest mounting height of any such units available, the maker says. Elimination of all deadweight in the bodies makes for a bigger payload than possible with bodies of like capacity, it also reports. Other features of the new Heil telescopics include a dumping angle of 42 to 50 deg for fast clean discharge; hoist sleeves of special precision-ground


If they're "sitting" more than you like, follow the example of BIG BEND COLLIERIES, Brazil, Ind. They experienced considerable "down-time" on draglines as a result of pinion breakage. Worn out walking pinions were replaced with pinions made by TOOL STEEL. They've delivered twice as many "walking miles" as competitive pinions and are still in operation.



Next time you need replacement parts, specify those made by TOOL STEEL . . . and watch your dragline deliver more "walking miles" per dollar.

*Write today for complete information.*

**HERE'S WHY:**

**KNOW HOW** . . . TOOL STEEL'S tremendous background in the treatment of metals has developed the hardest, toughest material for any service.

**EXPERIENCE** . . . TOOL STEEL, since 1909, has delivered to Industry thousands of hardened parts of every conceivable size, shape and service requirement.

**DEVELOPMENT** . . . TOOL STEEL'S metallurgical department, superb plant facilities and field service reports all combine to keep TOOL STEEL well ahead of competition, maintain its recognized superiority.

THE TOOL STEEL GEAR AND PINION CO.
CINCINNATI 16, OHIO, U. S. A.

# this simple idea cuts V-Belt costs

## — as a V-Belt bends, feel its sides change shape!

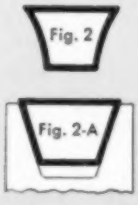
Pick up *any* V-Belt that has straight sides (Fig. 1) and bend it as if it were going around a pulley. At the same time, *grip its sides* with your fingers! You will feel the sides *bulge out* as in Fig. 1-A. Clearly, the bulging belt is forced to press *unevenly* against the V-pulley—and this concentrates wear at the points shown by arrows (Fig. 1-A).

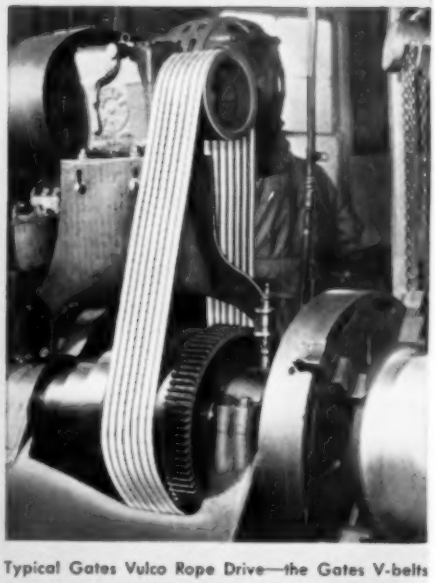

## Now bend the belt with CONCAVE SIDES

(U.S. PAT. 1813698)

## . . . the GATES VULCO ROPE (Fig. 2)

Instead of *bulging*, the precisely engineered CONCAVE SIDES merely *fill out* and become perfectly straight. This belt, when bent, *precisely fits* its sheave groove (Fig. 2-A). The sides press *evenly* against the V-pulley. Therefore, wear is distributed *uniformly* across the full width of the Gates Vulco Rope—and this means longer belt life and *lower belt costs* for you!



Typical Gates Vulco Rope Drive—the Gates V-belts are built with Concave Sides to insure longer belt wear.

**When you buy V-belts, be sure to get the V-belt with the CONCAVE SIDES — the Gates Vulco Rope!**

Gates

VULCO ROPE DRIVES

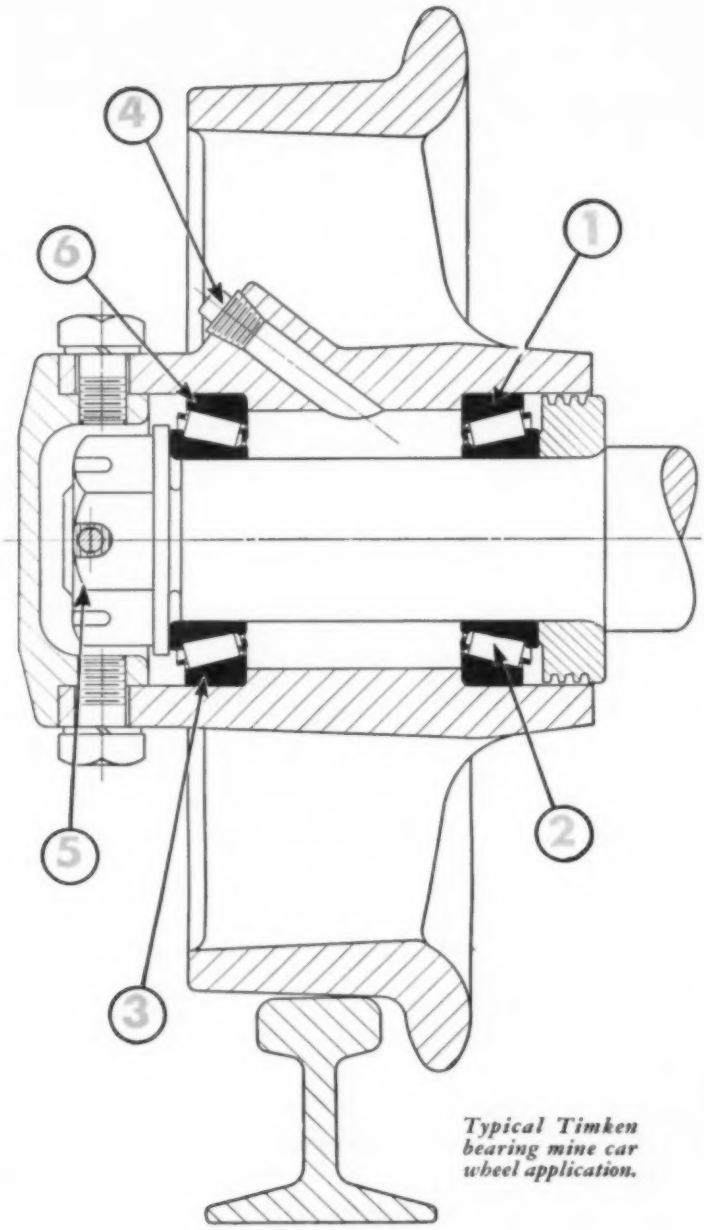
Gates Engineering Offices and Jobber Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

THE GATES RUBBER COMPANY
DENVER, U.S.A.
CS-5411

seamless steel; a wide choice of gas-tank

duced as much as 88% and in certain

# 6 WAYS HAULAGE COSTS HAVE BEEN CUT ON OVER 500,000 MINE CARS




*Typical Timken bearing mine car wheel application.*

MINE operators have cut haulage costs these six ways by mounting over 500,000 mine cars on Timken® tapered roller bearings:

1. **LESS MAINTENANCE AND REPAIRS.** Timken bearings take the pounding of mine car service with minimum time out for maintenance and repairs. One reason—to find steel good enough for Timken bearings, we make our own. (Something no other bearing manufacturer does.) Rollers and races are case-hardened to give them hard, wear-resistant surfaces and tough, shock-resistant cores.

2. **GREATER LOAD CAPACITY.** Because of line contact between rollers and races, Timken bearings have extra load-carrying capacity.

3. **MORE CARS PER TRAIN.** Timken bearings let you haul more cars per train with no increase in power requirements. The true rolling motion and incredibly smooth surface finish of Timken bearings practically eliminate friction.

4. **LESS LUBRICATION.** Lubricant stays in Timken bearings—mine dirt, dust and moisture stay out. Closures are more effective because Timken bearings keep hubs and axles concentric.

5. **SIMPLIFIED INSPECTION.** Wheels can be easily removed for bearing inspection by simply pulling the cap, cotter pin and nut.

6. **NO NEED FOR SPECIAL THRUST PLATES.** The tapered construction of Timken bearings enables them to take radial and thrust loads in any combination. No special thrust plates are required. Cars take curves easier.

You can always get these cost-cutting benefits for your mine cars by always specifying Timken tapered roller bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

*Cut your hauling costs by specifying* TIMKEN TAPERED ROLLER BEARINGS

TRADE-MARK REG. U.S. PAT. OFF.

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST ◫ LOADS OR ANY COMBINATION ◫

seamless steel; a wide choice of gas-tank mounting; and three models for every hauling need in the 21- to 30-ton capacity range. Details from Heil Co.

## METALLIC RECTIFIER (16)

A new metallic rectifier, capable of handling two shuttle cars at the same time has been announced by General Electric's Light and Rectifier Dept., Schenectady 5, N. Y. Designed to supply 50 kw of 250-v DC power from a 3-phase 60-cycle 4-wire supply at 230 or 460 v, the unit is equipped with two output circuits rated continuously at 100 amp and one circuit rated continuously at 20 amp. The rectifier is rated at 200 amp DC continuous, 300 amp for 10 min infrequently applied and 400 amp for 1 min infrequently applied. Each 100-amp DC circuit is capable of carrying 50% of listed overload rating. Designed for mine operation and skid-mounted, the unit is protected against condensation by dripproof construction and special anti-corrosion paint. Protection for the fan against dust is provided by an air filter.

## TRANSMISSION BELTS (17)

Thinner, more flexible, stronger and lower cost transmission belts are the main advantages of addition of patented 3-T cord, developed by the Goodyear Tire & Rubber Co., Akron, Ohio. Besides being capable of handling greater loads with smaller belts, the new Compass HD transmission belts are reported to have been greatly improved in all-round performance.

## VIBRATOR CONTROL (18)

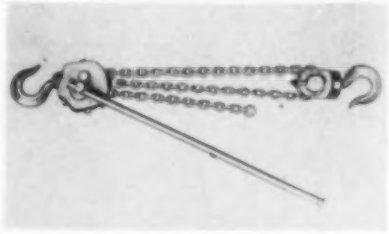
A new automatic-stop control designed to replace mechanical snubbing on vibrating equipment with smooth electrical braking action has been announced by Allis-Chalmers. Developed specifically for stopping all types of vibrating machinery, the new unit supplies electrical energy to plug-stop the motor safely without imposing high torque on either the motor or the drive. Essential parts of the control are a magnetic reversing switch, thermal relay units and pneumatic timers. Bulletin 07B8141, Allis-Chalmers Mfg. Co., 968 S. 70th St., Milwaukee, Wis.

## FLOCCULATING AGENT (19)

A new flocculating agent for use in the separation and filtering of water-dispersed solids has been announced by The Dow Chemical Co., Midland, Mich. It is reported that use of Separan 2610 has decreased material losses by as much as 80% and increased overhead clarity in settling operations by as much as five times, thus total product recovery is increased by as much as 5% and waste-disposal problems are greatly reduced. The new material is said to be effective in dosages as small as one part per two million parts of dispersed solids and its capacity for tying particles together is so great that the quantity required may be as much as 30 times less than that required with other types of materials. Filtration rates are increased so that the filter area normally required may be reduced as much as 88% and in certain conditions total moisture content of the filter cake may be reduced as much as 5%. Technical assistance and information for use are available from Technical Service and Development, The Dow Co.

## ROTATING FRAME INCREASES TRUCK MANEUVERABILITY (20)

New Truckstell "Swivel Frame" permits the front and rear halves of a truck to rotate to either side independently, keeping all wheels firmly on the ground no matter how rough the terrain, the maker says. Trucks equipped with Swivel Frame can haul through places otherwise impassable, have increased maneuverability, and eliminate frame twist with its resulting high maintenance cost, it is said. Reportedly stronger than the original truck frame members, Swivel Frame is available for all popular makes of trucks and types of drives. Literature from the Truckstell Mfg. Co., Union Commerce Bldg., Cleveland 14, Ohio.



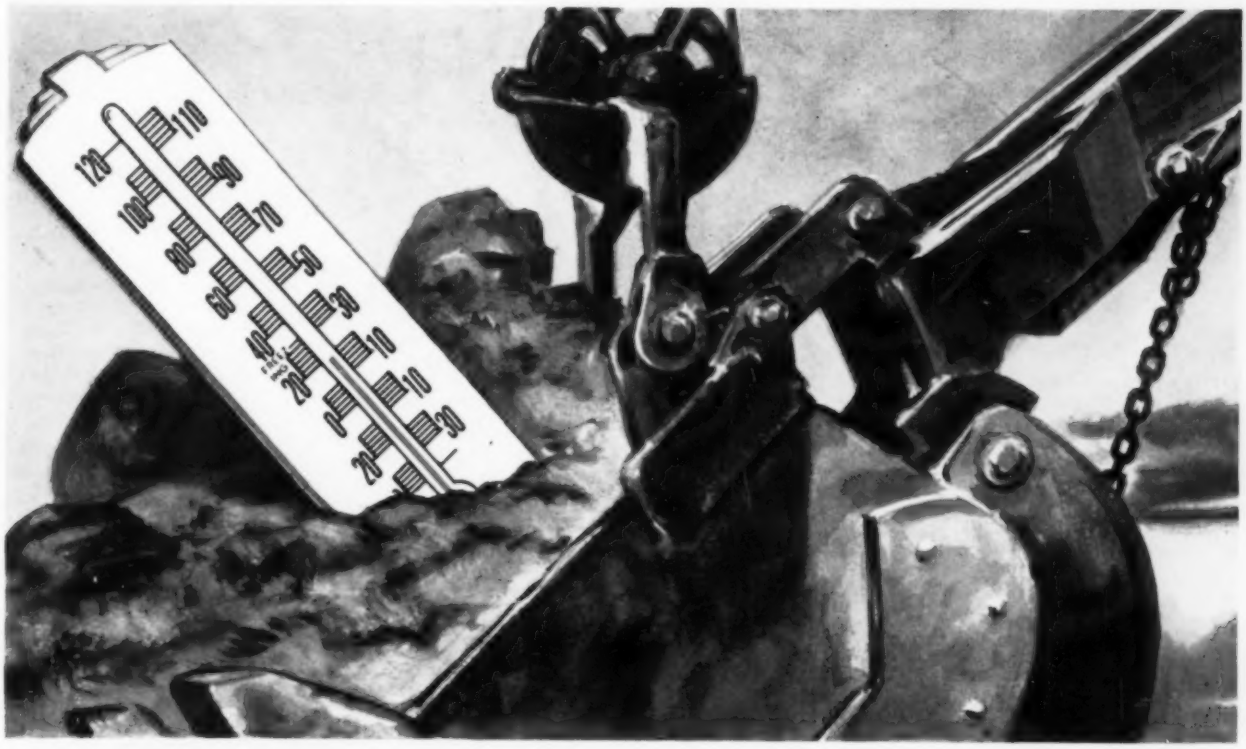
## HEAVY-DUTY CHAIN HOIST (21)

Coffing Super Power hoist was built to army specifications of a unit under 60 lb that would have a 2½-ton capacity with a single chain and be easily converted to a double-chain 5-ton-capacity unit. To achieve the necessary compactness, strength and efficiency, a completely new principle of ratchets and levers was designed, the company says. The Super Power is compact enough to be carried easily by one man and can be disassembled in the field with ordinary tools. The new patented mechanism further offers an efficiency of 75% and, in addition, the Super Power is the only ratchet hoist with a grease sealed mechanism which keeps dirt and grit out while it seals grease in, it is said. It can be refilled by simply removing a plug. Complete specifications and prices are available from Coffing Hoist Co., Danville, Ill.

## CENTRALIZED LUBRICATION AUTOMATICALLY TIMED (22)

Automatic application of fluid lubricants to bearings on individual industrial machines at predetermined intervals is provided by a new Lincoln Engineering

# Let it freeze...



## AMOCO HDX lubricates fast!

**The freeze is *on*—Amoco HDX Motor Oil is *in*—and all's well with your stripping-operation diesel engines.**

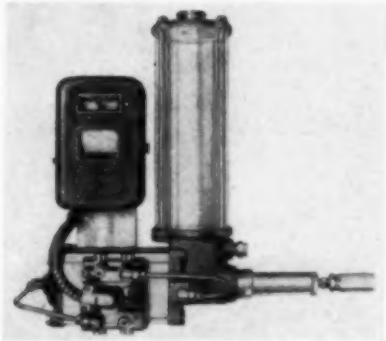
Even in coldest weather, this low-pour-point engine oil works right into fast-moving parts, insures easy starting! It lasts longer, too. Amoco HDX Motor Oil is high-detergent, non-gumming, non-corrosive . . . *safer* for those heavy-duty engines. Keeps them running cleaner, smoother. Actually *lengthens* engine life.

Amoco HDX is the *oil* you need to service *all* your diesel operated stripping equipment—*most economically!* Consult your nearest Amoco man right away.

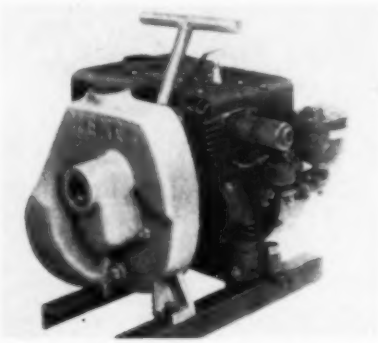

# AMOCO LUBRICANTS

*. . . SURE • SAFE FOR MINE MACHINERY*

AMERICAN OIL COMPANY • FROM MAINE TO FLORIDA



air-operated centralized lubrication system. The system was developed, the maker says, to service machines operating at varying rates of speed where applications of lubricant at varying intervals may be required, and to permit interchangeability of machine units without disturbing the lubrication system. Control may be by any one of three methods: mechanical control utilizing motion of the machine to actuate an air valve; electrical control utilizing an adjustable time clock; and manual control with an air valve actuated at machine operator's discretion. Details in Bulletin 806 from the Lincoln Engineering Co., Industrial Div., 5729 Natural Bridge Ave., St. Louis 20, Mo.



### PORTABLE UTILITY PUMP (23)

New Kenco Type 114 utility pump designed for mine use pumps up to 6,000 gph, yet is exceptionally light and well-balanced, weighing only 65 lb. Powered by the new improved 1½-hp Briggs & Stratton engine, the unit starts fast and requires a minimum of maintenance, the maker says. The seal between pump and engine is self-lubricating and the Type 114 has no check valve or trick priming gadgets that can become troublesome. Self-priming after the initial prime, the pump will lift from 25 ft and discharge as high as 80 ft. Details from Kenco, Inc., Lorain, Ohio.

### 4½-IN DEEP-HOLE DRILL (24)

A new deep-hole percussion drill with a hammer diameter of 4½ in, announced by Gardner-Denver Co., Quincy, Ill., is designated as Model SFH123 and, like the 4-in Model SFH99, has been engineered for use with the Gardner-Denver Ring Seal shank and sectional drill rods. It is mounted on a compact screw-feed guide shell which handles steel changes up to 8 ft. The SFH123 is said to pro-

# NEW

## INTERNATIONAL 60,000 GVW 6-WHEELER

### With New 212 hp. Royal Red Diamond Engine

**There's a new model** in the INTERNATIONAL line of 6-wheelers — a model with the power to haul capacity loads over the roughest terrain — a model built to absorb severe loading shocks, and with ability to move heavy loads long distances over-the-road at maximum safe speeds.

The new RF-230 is powered by the new INTERNATIONAL 212 hp. Royal Red Diamond 501 engine delivering 444 lb-ft torque at 1600 rpm. It has hydraulic full-power steering, 12-volt electrical system, other features. Engine and all components are precisely coordinated to assure maximum operating economy, minimum maintenance and long life.

This newest INTERNATIONAL is Tough-Job engineered like all INTERNATIONALS — has a surpassing measure of the performance, strength and stamina qualities that have made INTERNATIONAL the 6-wheel sales leader for 20 straight years. It is built to do big jobs, save big money. Get full facts from your INTERNATIONAL Dealer or Branch.

## QUICK FACTS...

**GVW rating,** 60,000 lbs.

**Wheelbase,** 175 inches; optional wheelbases available.

**Engine,** INTERNATIONAL Royal Red Diamond 501, 4½-inch bore, 5¼-inch stroke, 501 cu. in. displacement. Max. hp., 212 at 3000 rpm. Max. torque, 444 lb-ft at 1600 rpm.

**Frame,** double, heat-treated alloy steel. Two 15,000 lb. capacity front tow hooks, standard.

**Clutch,** 15-inch single plate with vibration damper.

**Transmission,** direct-in-fifth main plus overdrive auxiliary.

**Standard equipment** includes hydraulic full-power steering, air brakes, 12-volt electrical system.

**Optional equipment** includes LPG fuel system, Comfo-Vision space saver cab for maximum front axle loading; high altitude engine equipment; tinted safety glass all around.

**INTERNATIONAL HARVESTER COMPANY · CHICAGO**

International Harvester Builds **McCORMICK**® Farm Equipment and **FARMALL**® Tractors...Motor Trucks...Industrial Power...Refrigerators and Freezers

***See the season's new TV hit, "The Halls of Ivy," with Ronald Colman and Benita Hume, Tuesdays, CBS-TV, 8:30 p.m., EST***

**INTERNATIONAL® TRUCKS**

*"Standard of the Highway"*

vide increased drilling speed and power for handling longer holes or for drilling long holes of larger diameter.

## *Equipment Shorts*

**(25) OPEN-END V-BELTING** fastened with improved Alligator V-belt fasteners can be fitted to any drive quickly and economically where endless belt is not handy or machine must be dismantled otherwise. The one-joint fasteners work on single and multiple drives with minimum stretch and maintenance, company says. Introductory units from Flexible Steel Lacing Co., Chicago 4.

**(26) WIRE-ROPE FITTING,** new wedge-type choker socket, provides a quick, inexpensive way to put an eye in a wire rope without splicing and can be installed on the job without special tools, maker reports. Electric Steel Foundry Co., Danville, Ill., or Portland 10, Ore.

**(27) HYDRAULIC HOSE AND COUPLINGS,** new Joy "Surgepruf" line for medium-high and high pressure service features "double-wedge" grip and has special slotted bushing for retightening coupling without disassembly if loosened by vibration or flexing. No special tools are needed for installing coupling. Joy Mfg. Co., Pittsburgh 22, Pa.

**(28) FOR GREATER HAULAGE CAPACITY,** LeTourneau-Westinghouse Co., Peoria, Ill., has increased capacity of its new Model C rear dump from 18 to 22 tons without change in price. New heaped capacity of 17 yd is reflected in unit's dimensions, together with greater stability, more reinforcement. Model C Tournapull powering it has speeds up to 30.2 mph.

**(29) TO CHECK SMOKE CONTROL,** new "MSA Smokescope" is a quick, easy determination of whether smoke is excessive and fuel is being properly burned for full Btu advantage. Handy binocular-type unit is more accurate than old-type "smoke chart," company says. Details from Mine Safety Appliances Co., Pittsburgh 8, Pa.

**(30) INCREASED HORSEPOWER** is one of several improvements in Caterpillar No. 12 motor grader, now offering 115 hp and speeds to 21.5 mph. Clutch and transmission capacity has been boosted and both Cat No. 12 and No. 112 units now have convenient, one lever from-the-seat starting. Caterpillar Tractor Co., Peoria, Ill.

## FREE BULLETINS

**(35) MINING TOOLS**—The Carmet Div., Allegheny Ludlum Steel Corp., Pittsburgh 30, offers a new methods manual and catalog on cemented-carbide mining tools, covering a complete line of cutting and drilling bits for the coal industry. Various types of cutter bits, finger bits, roof-bolting drills and coal drills are described, and reconditioning equipment and procedures for use on Carmet carbides also are recommended.

**(36) SCRAPER HOISTS**—A full line of air and electric hoists for handling bulk materials of all types is described in a

## What Electrical Connectors would you choose ...for these installations?

Modern mining techniques allow little time for coddling men or equipment . . . so it's a safe bet your answer to the question in our headline will be based on more than just the electrical requirements of the equipment. Such important considerations as safety, efficiency, durability and maintenance cost, will influence your selection. *This is as it should be and we're glad it's true* . . . for the mining industry's constant search for the best available equipment has made JOY Electrical Connectors their preferred choice since 1928.

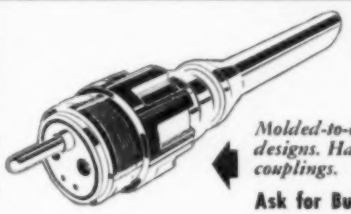
**Why settle for less . . . when the best costs less in the long run?**

JOY plugs and receptacles are specifically designed to provide long-range, maintenance-free service under the most adverse operating conditions . . . and they're available in styles and sizes to meet every mining need. Two of the currently *most popular* designs for mining installations are illustrated at right. Equipped with non-corrosive metal couplings and flame-resistant Neoprene bodies, both are moisture-tight, shatter-proof and distortion-resistant.

**Straight Pin Bigun (SPB)**—Have threaded metal couplings. Plugs are factory-vulcanized to 36" cable leads or to lengths as specified. See Bulletin B39a for complete information.

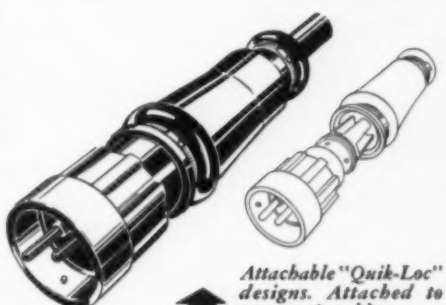
**Attachable "Quik-Loc" styles**—Attach quickly to customer's own cable. Newly designed couplings completely engage or disengage in ¾ turn. See Bulletin B57 for complete details.

JOY plugs and receptacles are available for both AC and DC applications. In addition, "SPB" and "Quik-Loc" connectors may be supplied with pilot control contacts for *permissible operation* when used in conjunction with JOY'S Bureau of Mines-Approved distribution centers (SCC units). Ask us for complete information, ***Joy Manufacturing Company, Henry W. Oliver Building, Pittsburgh (22) Pa.*** In Canada: *Joy Manufacturing Co. (Canada) Limited, Galt, Ont.*



*Molded-to-cable "SPB" designs. Have threaded couplings.*

**Ask for Bulletin B39a.**



*Attachable "Quik-Loc" designs. Attached to customer's cable.*

**Ask for Bulletin B57.**

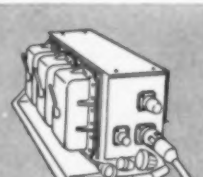
W&D CD5447

*Consult a Joy Engineer*

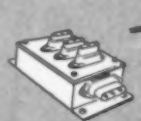
# JOY

SPECIALISTS IN CREATING ELECTRICAL CONNECTORS FOR MINING AND INDUSTRY SINCE 1928

**Write for information on these JOY products**



Safety Circuit Centers



Distribution Boxes

Portable Lighting

New Cable Vulcanizer

# 12000 hours before first overhaul

Hyland Coal Co. of Locust Gap, Pa., owns three Caterpillar D8 Tractors. One D8 is a veteran of 15,000 hours. Its CAT* Diesel Engine was overhauled at 12,000 hours—and needed only a set of rings and one new piston. Transmission and final drive were not overhauled until 14,000 hours. The two other D8s have a total of almost 9000 hours between them, and the company reports no trouble with either machine.

Here's what one of the company's "Cat"-skinners says: "You don't have to advertise these tractors, do you? Everyone knows they're tops."

The D8 has stamina to work in equipment-busting material. Even in harmful abrasive dust, really effective filters and seals protect the factory-built precision of its engine and hydraulic system. The D8 is now equipped with an oil-type flywheel clutch for even longer trouble-free operation—even on jobs that are particularly rough on clutches.

Note the big, *high-profit* load on the No. 8A Bulldozer blade in the illustration. Scientific moldboard design imparts a rolling motion, even in "dead" material. Balanced traction and easy controllability let you move a lot of material *fast*, even in tricky going.

Caterpillar track-type Tractors are built to do *more work* at *less cost* with *lower down time* and *longer work life* than *any* competitive unit. Strong statement? Yes! But we can back it up. See your Caterpillar Dealer for on-the-job *proof*. He'll help you select the tractor-bulldozer combination that's right for you. He represents the most complete line in the industry. And he backs his sales with fast, dependable service and genuine factory parts.


Caterpillar Tractor Co., Peoria, Ill., U.S.A.

**CATERPILLAR***

*Both Cat and Caterpillar are registered trademarks—®

**NAME THE DATE... YOUR DEALER WILL DEMONSTRATE**

FIRST CLASS

USE THIS CARD

**CARD USERS NOTE—Please be sure to give your name, position and company to insure proper handling of your request. Since some cards have been received without names, we would be glad to have you check us if you have no response to your request within a reasonable time.**

**YES—I would like more information . . .**

**Please send me catalogs for further information about the items from the Equipment News Section whose numbers are circled. (January, 1955)**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 6 | 11 | 16 | 21 | 26 | 31 | 36 | 41 | 46 | 51 | 56 | 61 | 66 |
| 2 | 7 | 12 | 17 | 22 | 27 | 32 | 37 | 42 | 47 | 52 | 57 | 62 | 67 |
| 3 | 8 | 13 | 18 | 23 | 28 | 33 | 38 | 43 | 48 | 53 | 58 | 63 | 68 |
| 4 | 9 | 14 | 19 | 24 | 29 | 34 | 39 | 44 | 49 | 54 | 59 | 64 | 69 |
| 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 |

**In addition, please send me data on these OTHER products advertised in this issue (give name and page number)** .....

**Name (Print)** ..... **Position** .....

**Company** .....

**Address** .....

**NOT GOOD if mailed after March 1, 1955**

features of each type and size are carefully outlined, along with specifications, capacities, sizes, symbols and accessories.

(37) SHOVEL HOIST DRIVE—Bulletin giving the A-Z story of Magnetorque hoist drive for P&H shovels answers "Just What Is Magnetorque?"; gives a schematic comparison with adjustable voltage systems; and covers leading questions about Magnetorque. Bulletin X-156, Harnischfeger Corp., Milwaukee 46, Wis.

(38) ARMORED MOTORS—20-p Bulletin GEA-4654C describing armored motors (DC Types MD and MDP, 600 Series) is available from the General Electric Co., Schenectady 5, N. Y. It provides information on performance and maintenance features of the heavy-duty G-E motors, including horsepower ratings, mechanical data, diagrams and applications.

(39) RUBBER-TIRED TRACTOR—28-p Bulletin 54-005T, describing and illustrating features of the 208-hp rubber-tired tractor built by LeTourneau-Westinghouse Co., Peoria, Ill., is offered by the company. The folder shows how the Tournatractor's range of speeds cuts minutes from the work cycle, why the machine requires low maintenance and few repairs, and lists other features for top performance and operator comfort, plus interchangeable tools ranging from bulldozer to snow plow.

(40) CAR SPOTTERS—Detailed design, operating and application data on Link-Belt railroad-car spotters and drum-type pullers are offered in 24-p Book 2092. Engineering information, instructions for calculating rope pulls, and typical layouts for both car spotters and car pullers are included. Link-Belt Co., Chicago 1.

(41) DRILL BITS—Bulletin B-1, "Tungsten Carbide Rok-Bits," illustrates the full line of Brunner & Lay Rok-Bits. Detailed recommendations are made for the use of every bit—thread type, size of drill steel and machine normally used, range of sizes with specific thread, etc. From Brunner & Lay, Inc., Franklin Park, Ill.

(42) TRACTOR—Detailed data on features of the Allis-Chalmers HD-9 diesel-powered 72-hp crawler tractor are provided in a new 30-p catalog available from the Tractor Div., Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. The engineering, mechanical and operating story of the HD-9 is fully covered and on-the-job photos illustrate the tractor's versatility and performance ability.

(43) WIRE-ROPE ASSEMBLIES—24-p Catalog 5201, "Macwhyte Safe-Lock Wire Rope Assemblies," describes a variety of assemblies with a wide range of applications. They consist of a unit of flexible wire rope with permanently attached fittings of various types and sizes to make a complete flexible operating unit. Macwhyte Co., Kenosha, Wis.

(44) MALLEABLE COUPLINGS—16-p Bulletin CF 1054-10, offered by Gustin-Bacon Mfg. Co., Kansas City 6, Mo., demonstrates the savings in time and labor made by Rolagrip couplings for plain end pipe and Gruvagrip and Gruvajoint couplings for grooved pipe. Diagrams and complete specifications for these products, as well as Gruvagrip fittings, are included.

(45) FLUID COUPLINGS — Bulletin 144-D provides complete installation and performance data, and shows the ease of applying the Twin Disc line of fluid couplings on any type of industrial equipment, powered by any type of electric motor or internal combustion engine from ¾ to 850 hp. All the installation hookups provided by the broad variety of fluid couplings are given, along with typical on-the-job applications in various industries. Twin Disc Clutch Co., Racine, Wis.

(46-49) TRUCK BODIES, HOISTS—Several new bulletins with detailed data on the units listed now are available from the Heil Co., Milwaukee 1, Wis. Circle 46 on the postage-free card for Bulletin BH-54110 covering the features and specifications of Heil extra heavy duty model HH-11 dump bodies in capacities of 4 to 12.3 cu yd. Bulletin BH-54111 (circle 47) discusses the new line of weight-saving Heil telescopic hoists, including Models 2T62-64, 2T72-64, and 2T73-96, which cover capacities of 21 to 30 tons. Bulletin BH-54114 (circle 48) describes the Model 1715 hydraulic hoist, 8- to 11-ton capacity; and Bulletin BH-54115 (circle 49) the 1821 hydraulic hoist, with a capacity of 10 to 16 tons.

(50) CORE DRILL BITS—Hoffman Bros. Drilling Co., Punxsutawney, Pa., offers its new price list with prices effective Nov. 1. Included are specifications, ordering information and prices on Hoffman Bros. complete line of Oriented diamond-core drill bits and supplies.

(51) EARTHMOVER MOVIE—"Mining on the Move," a 15-min sound-and-color movie picturing and describing modern haulage and materials-handling methods used in a wide variety of mining applications has been produced by LeTourneau-Westinghouse Co., Peoria, Ill., and is available without charge on a loan basis to engineering groups, school classes and other organizations interested in mining operations. The film shows various operations of Tournapull scrapers working in diamond and iron mines; rear dumps in bauxite, iron, gypsum and copper mine applications; and rubber-tired dozers at titanium, magnetite and gypsum mines.

(52) MOTOR STARTERS—Folder 1060 describing a new line of air-break electric starters for 2,200-5,000-v motors is offered by the Electric Controller & Mfg Co., Cleveland 4, Ohio. The folder illustrates starters using the EC&M Type ZHA 50,000-kva air-break contactor, built for circuits of higher fault capa-

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bility with current-limiting power fuses, and in Valimitor style (volt-ampere-limitor) in which air-core reactors limit infinite kva to a finite value easily cleared by the 50,000-kva contactor.

(53) ROLLER-BEARING MOVIE—Recently improved spherical roller bearings, with up to 50% increased capacity and much longer service life, are presented in a new full-color sound-slide film by SKF Industries, Inc., Philadelphia 32. The film was produced for heavy industrial machinery and equipment design engineers, and production executives using antifriction bearings in their operations, and also is particularly suitable for engineering society audiences, according to SKF, which offers it for showings without charge.

(54) CARBIDE TOOLS—Condensed catalog with latest price changes and specifications on all standard cemented-carbide tools and blanks is offered by Carboloy Dept., General Electric Co., Detroit 32, Mich. Brief-A-Log GT-285 covers throwaway inserts, new saw tips, solid- and brazed-type woodworking knife blanks, right- and left-hand offset threading tools and blanks for roller-turner tools.

(55) FLUID POWER EQUIPMENT—Bulletin 10051-D illustrating and describing Oilgear's complete line of fluid-power pumps, motors, transmissions, cylinders and valves features a new electric-hydraulic servo control system for pumps and transmissions up to 150 hp, a new line of Oilgearducers for constant-torque drives, and two additional variable-delivery feed pumps with four times greater capacity. Oilgear Co., 1587A W. Pierce St., Milwaukee 4, Wis.

(56) WELDING ELECTRODES—Metal & Thermit Corp., New York 17, offers a complete new set of literature describing its entire line of Murex electrodes for arc welding, as well as rods and wire for gas, submerged arc and inert arc. Specific catalogs cover electrodes for mild steel and low alloy (E-177), coil wire for submerged arc welding (E-180), stainless-steel electrodes and bare wire (E-183), aluminum and phosphor bronze electrodes and bare wire (E-185), aluminum electrodes and bare wire (E-179), electrodes for cast iron (E-182), and gas welding rods (E-181).

(57) POWER TRANSMISSION — New Catalog GC-101-B provides detailed data, sizes, dimensions, etc., on the complete line of Browning power-transmission equipment, including single and multiple groove and variable pitch sheaves; V-belts, fractional, multiple, steel cable, super, griproll, griplink; couplings, fixed bore and bushed type, rigid and flexible; chain couplings, with and without covers; paper pulleys; keystock; hubs for split bushings, set collars; frictions; roller-chain sprockets; roller chain; and new line of Browning Poly-V sheaves and Poly-V belts. Browning Mfg. Co., Maysville, Ky.

(58) WIRE AND CABLE—Completely new General Electric Flamenol wire and cable bulletin contains application, product and technical information on Flamenol wire and cable for machine-tool, appliance, traffic-control, station-control and electric equipment applications, as well as similar information on G-E wire and cable for other applications, such as, Geotrol gasoline- and oil-resistant wire, Flamenol bus-drop cable, neon sign cable, etc. Bulletin 19-354, Construction Materials Div., General Electric Co., Bridgeport 2, Conn.

(59) DEEP-HOLE DRILLING—Application data on deep-hole drilling with percussion rock drills is offered those engaged in rock excavation by Gardner-Denver Co., Quincy, Ill. Actual job reports and 13 p of application drawings suggest some of the varied uses for this efficient drilling method, including vertical and horizontal ring drilling, pillar recover, block caving, exploration and sampling, conduit drilling, demolition work, and deep-hole percussion drilling in quarries, open-pit mines and surface rock cuts.

(60) POWER UNITS—Bulletin E-7 describing and illustrating the 225- to 675-hp Le Roi L3460 and L4000 engines includes charts showing the space savings of the integral V-12 design and horsepower ratings with LPG fuel and gasoline or natural-gas fuel. Applications discussed include standby or continuous power in generator, blower or pump service. Le Roi Div., Westinghouse Air Brake Co., Milwaukee 14, Wis.

(61) HYDRAULIC CYLINDERS—Catalog 754-68 describing the new "Compact" hydraulic cylinders for general industrial application is available from Vickers, Inc., Detroit 32, Mich. It contains full dimension and ordering data and also installation drawings for each of five cylinder mounting styles available.

(62-64) TRUCK BODIES, HOISTS — Galion Allsteel Model 12N-4 dump bodies in 9- or 10-ft lengths and matching hydraulic hoists with capacities of 11 to 14 tons are covered in Catalog L9828 (circle 62 on postage-free card) offered by the Galion Allsteel Body Co., Galion, Ohio. Catalog L-9886 (circle 63) describes the Galion heavy-duty Model 12N-7 dump bodies available in lengths of 10 to 13 ft and matching hydraulic hoists rated from 15 to 25 tons. Catalog LL-103 (circle 64) discusses Galion Allsteel Duo-scopic hoists, Models 55381 and 66381, suitable for use on tandem-axle trucks and featuring lifting capacities from 18 to 22 tons.

(65) INSTRUMENT SWITCHES—Catalog 8054-IN covering Esco Types P and JR rotary multipole switches contains complete wiring diagrams and contact charts for voltmeter, ammeter and voltmeter-ammeter switches. The units covered are designed to provide low-cost switching in complex circuits, using a single compact switch for control of multiple circuits, instead of separate switches. From Electro Switch Corp., Weymouth 88, Mass.

(66) CONTINUOUS WEIGHING METERS—Data Sheet 11.5-3 describes the Massometer designed for flow-rate measurements of free-flowing solids, and Merchen scale meter which provides continuous belt weighing of solids. These Wallace & Tiernan pneumatic balance meters are used with Brown recorders and controllers to provide fast, accurate and continuous handling of bulk materials. Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia 44.

(67) PHOTOCOPYING — Faster, easier photocopying with Remington Rand's new low-cost Rotoflo is described in Leaflet P-385 from Remington Rand Inc., New York 10. Teamed with Remington Rand's Transcopy, the Rotoflo is said to prepare photocopies of records up to 14 in wide, of any length, giving positive prints in less than 1 min. Copying is fast, accurate, versatile and simply processed, requiring no darkroom.

# Bessemer

## operation proves that Hazacords can take punishment

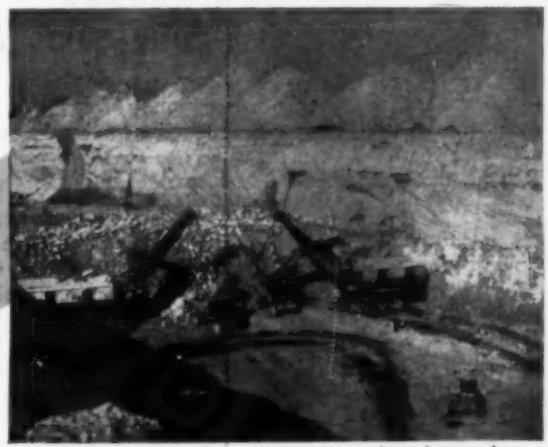
All the units in this operation are "big bruisers", selected for ability to operate on a big scale under the most difficult conditions. At this Bessemer Limestone and Cement Company limestone quarry the five-cubic-yard dippers can load at the rate of 400 tons per hour. The blasting, rock dust and rough ground mean that only top quality materials can keep all operating equipment from trucks to electrical cables continually on the job.

Operating at 4160 volts, the Hazacord Type SH-C, 5-kv portable cables have proved themselves able to withstand the worst treatment this operation can provide. The extremely durable Hazaprene ZBF sheath is excellent protection against the constant scraping, twisting and dragging that is normal in this type of operation. Hazard Keystone rubber insulation and shielded construction provide long electrical life and maximum protection for personnel when handling the cables.

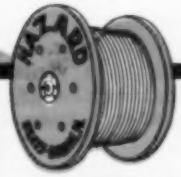
No matter what the type of installation, there is a Hazard cable that will handle power distribution up to 15,000 volts. Ask your Hazard representative or write Hazard Insulated Wire Works, Division of The Okonite Company, Passaic, New Jersey.

Men can carry shielded Hazacord high voltage cables with complete safety from electrical discharges.

Hazacords are known for their reliability in blasting operations such as this where there is constant threat from impact and sharp uneven surfaces.



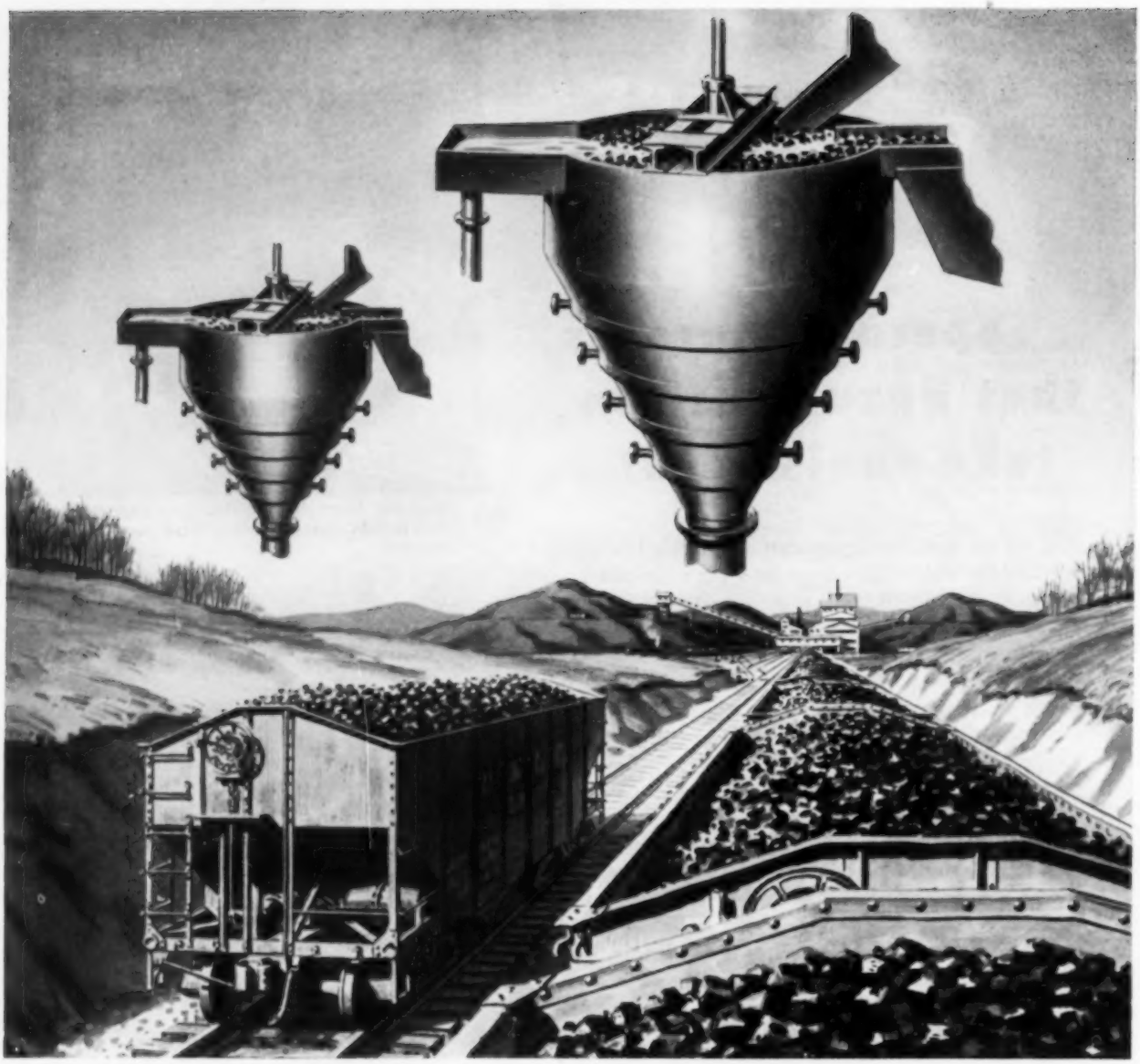
Hazacords give long service even when dragged continuously over rough, destructive terrain like that shown here.




**HAZARD**
**insulated cables**

PRODUCT OF OKONITE RESEARCH

2445



# 40 TO 600 TPH OF CLEAN COAL

*at minimum cost per ton*

Small mines, large mines, medium sized mines—the Chance Process offers you the most economical way to get accurately sized, well cleaned coal.

**HIGH SEPARATING EFFICIENCY.** Close to 100% recovery of saleable coal. Efficiency remains constant because the specific gravity of the mixture does not change with fluctuating feed rates or changing qualities of coal.

**EXTREME FLEXIBILITY** One washing unit handles coal at gravities ranging from 1.35 to 1.65 and sizes ranging from 10″ to ⅛″. A change in gravity takes only five minutes, simply requires opening or closing of valves.

**LOW COST, DEPENDABLE OPERATION.** The Chance Process is known the world over for its low cost, uniform, trouble-free performance. The entire operation requires only one man. The unit is of heavy duty construction . . . has a minimum of moving parts.

Whatever your coal cleaning problem may be, the Chance Process provides the economical answer. Chance Cones are available in a variety of sizes. Our engineers will be glad to discuss your requirements at any time.

THE HEART OF THE PREPARATION PLANT

## UNITED ENGINEERS & CONSTRUCTORS INC

NEW YORK 17 PHILADELPHIA 5 CHICAGO 2

*WITH A BACKGROUND OF OVER SEVENTY YEARS' EXPERIENCE*

# NEWS ROUND-UP

## NCA Directors Define Policies, New Fuels Committee Meets

THE BOARD OF DIRECTORS of the National Coal Association Dec. 10 completed a 2-day meeting devoted to discussions of the association's policies and programs for the forthcoming year. At the meeting, called for in a resolution passed by the membership at the November convention, in Pittsburgh, the directors passed a series of resolutions on various subjects, directing the NCA staff to carry on an aggressive campaign to achieve legislative assistance or other means of resolving the coal industry's major problems.

The policy resolutions drafted by the NCA directors covered such subjects as competitive fuels, both domestic and foreign, including the threat of imported natural gas and residual oil, together with those of reciprocal trade, public power, atomic energy, taxes, percentage depletion, railroad deficit operations, the time-lag bill, the ICC commodities clause and the Fair Labor Standards Act. The board also voted to hold the next NCA convention in Washington, D. C., in June 1956.

Also during the meeting, the newly named NCA "special committee to consolidate and coordinate the policies and efforts of the industry in reference to competitive fuels" held its first session to review some of the industry's problems. The committee was appointed by L. C. Campbell, NCA president, following a motion passed by NCA directors at the Pittsburgh convention. In a press release discussing the committee's first meeting, Mr. Campbell Dec. 17 said that "as a result of the action taken by the coal executives, the members of the National Coal Association in convention, as well as the board of directors, and in order to avoid any confusion among any elements interested in coal, this special committee is the only group now designated to speak authoritatively for the coal producers of this country on the problems heretofore enumerated."

After careful deliberation, Mr. Campbell reported, the committee set up the following as principles governing the group's action:

"1. The coal industry is unnecessarily and severely injured by the importation of residual oil. Therefore, we favor a quantitative restriction on such imports and an equalization of tariffs on residual oil with other petroleum products.

"2. The coal industry is against and will fight the dumping of natural gas at a price less than the average cost at the point of consumption, plus a reasonable profit.

"3. The coal industry is for control of importation of natural gas to prevent it from supplanting domestic fuels."

The group also "gave consideration to the so-called Phillips decision, dealing with the regulation of the producers and gatherers of natural gas, but the committee at this time has taken no position on the question of whether or not that decision should be retained or reversed," Mr. Campbell reported.

Members of the new NCA special committee, in addition to Mr. Campbell, include: Raymond E. Salvati, president, Island Creek Coal Co.; Kenneth A. Spencer, president, Pittsburg & Midway Coal Mining Co.; D. W. Buchanan Jr., president, Old Ben Coal Corp.; L. Russell Kelce, president, Sinclair Coal Co.; George H. Love, president, Pittsburgh Consolidation Coal Co.; C. J. Potter, president, Rochester & Pittsburgh Coal Co.; and Harry LaViers, president, South-East Coal Co. Tom Pickett, NCA executive vice president, was named by the committee as its executive secretary and to act "as its spokesman and the individual through whom all matters pertaining to questions under consideration must be cleared."

### Cabinet Fuels Group Holds First Meeting

President Eisenhower's Cabinet Committee on Energy Supplies and Resources Policy held its first meeting Dec. 11 in preparation of its recommendations on a national policy for coal, oil and natural gas. Other meetings would be necessary, it was announced, but no details of the session nor indication when its report would be ready for the President were released. The committee already has obtained an extension of the deadline for its report.

Earlier, on Nov. 19, the staff report of the President's Interdepartmental Committee on problems of the bituminous industry was filed with its chairman, Mobilization Director Arthur S. Flemming. While the report was not made public, it was understood to contain recommendations for action on a "step-up in the government's use of coal, where this is economically feasible," as well as for a co-operative research program. The committee was understood not to have

### Also in This Section



## Bituminous Industry to Campaign For Reduction of Roof-Fall Fatalities

The bituminous coal industry is launching an intensive safety campaign aimed at reducing fatalities from falls of roof, rib and coal, it was announced Nov. 28. Preliminary plans for this campaign were drawn at a meeting of representatives of the coal industry, United Mine Workers of America, and federal and state governments.

Harry Gandy Jr., director of safety, National Coal Association, was named general chairman, and a committee representing all interested parties is being set up to spark the program. Administrative and planning work will be carried on by personnel of the U. S. Bureau of Mines, under active direction of Harold Sloman, assistant to the director. Cooperating groups, in addition to the USBM and NCA, include the UMWA, Bituminous Coal Operators' Association, Southern Coal Producers' Association, the National Safety Council, Joseph A. Holmes Safety Association, state departments, and state and local institutes.

Those who attended the initial meeting in Washington included: J. J. Forbes, H. F. Weaver, W. H. Tomlinson, James Westfield and H. J. Sloman, USBM; J. B. Benson, Southern Coal Producers' Association; M. J. Ankeny, Bituminous Coal Operators' Association; Robert Norcross, West Virginia Coal Association; G. G. Grieve, National Safety Council; W. J. Schuster, Hanna Coal Co.; L. H. Johnson, Peabody Coal Co.; Harry Gandy Jr., NCA; Charles R. Ferguson, UMWA; H. M. Gallaher, W. H. Roll and A. D. Sisk, Kentucky Department of Mines; Ford Sampson, Ohio Coal Association; and R. H. Mason, coal editor, Beckley (W. Va.) *Post-Herald*.

## "Look what rib-pinching does to our shuttle car cable!"

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made direct recommendations on such problems as residual oil imports and natural gas because "these matters will be meshed into the discussions and decisions that will be made by the cabinet-level group in the near future."

### 1954 Mineral Census The First Since 1939

The 1954 Census of Mineral Industries, to be begun by the Bureau of Census early in 1955, will be the first full-scale collection of data on industry operations since the 1939 Census, the Bureau of Census has pointed out in urging that business co-operate by prompt and accurate return of the information forms. The statistics and data collected, which are compiled to keep returns from individual companies confidential, are used by industry and government alike. The Census of Mineral Industries which, with the Census of Manufacturers and Census of Business, was provided for by Act of Congress last year, will cover approximately 35,000 mines, quarries and oil and gas establishments. Data collected will include number, size, location and character of the operations, number of workers, value of products, principal expenses, expenditures for plant and equipment, fuels and electric energy consumed, installed horsepower, etc. It will be a mail canvass and will be coordinated with the USBM statistical program as far as possible to reduce the reporting burden.

# News Briefs and Trends

### W. Va. Coal & Coke Sells 10,000-TPD Mine Properties

E. Morgan Massey announced Dec. 13 at Richmond, Va., that the Omar Mining Co. has acquired the entire Logan County, West Virginia, coal mining operations of the West Virginia Coal & Coke Corp. A. T. Massey Coal Co., which previously served as an export and eastern distributor for West Virginia Coal & Coke, will be affiliated with Omar Mining Co. in its coal sales program, and through its new sales division, under the name "The West Virginia Coal & Coke Corp.," has acquired the coal sales organization of West Virginia Coal & Coke Corp. and will continue to supply customers with the Omar and Omet brands of utility, metallurgical, industrial and domestic coals. The 10,000-tpd mining capacity of the Logan County mines will be maintained by Omar Mining Co., Mr. Massey reported. In confirming the sale, Morris Creditor, president of West Virginia Coal & Coke Corp., stated that the company still controls undeveloped coal reserves in northern West Virginia, but at the present time is not actively engaged in mining operations. West Virginia Coal & Coke will continue to operate The Junior Mercantile Stores at Omar, however, and through its subsidiary, the Ohio River Co., will continue in the river transportation business, Mr. Creditor said.

### Ayrshire Opening Strip Mine In Western Kentucky

Start of construction of a new strip mine near Central City, Muhlenberg County, Ky., was announced Dec. 2 by James W. Morgan, president of the Ayrshire Collieries Corp., Indianapolis. The property, planned to produce nearly 2,000,000 tons of coal annually from the Nos. 11 and 12 seams when it goes into production in April, 1956, will be operated by the Gibraltar Coal Corp., a wholly owned Ayrshire subsidiary. Coal produced will be shipped in barges via the Green and Ohio Rivers to the Clifty Creek plant now being built by the Indiana-Kentucky Electric Corp. to supply power to the new AEC plant at Portsmouth, Ohio. Coal will be uncovered with a 45-yd Marion shovel, hauled by trucks to the preparation plant to be located on the south bank of the Green River, and transferred from the plant into barges by belt conveyors. The company is scheduled to ship 2,000,000 tons a year for 15 yr to the Indiana-Kentucky plant. Some coal also will be shipped via the Illinois Central, which is building a spur to the tipple.

### Hudson Coal to Distribute Automatic Heating Equipment

A line of automatic anthracite-burning equipment with the company's Sterling trademark will be distributed through Hudson Coal and Hudson Sterling dealers, H. H. Shaver, general sales agent, The Hudson Coal Co., Scranton, Pa., announced last month. The "Hudson Sterling Anthratherm" boiler units will be available in four models for hot water and steam systems and in two models for forced warm air systems, and the line also will include four Hudson Sterling conversion stokers. "As equipment sales move steadily ahead of figures for corresponding periods of last year," Mr. Shaver said, "it is obvious that automatic anthracite's outlook is ever brightening. It is our desire to make available to our retail distributors equipment which we firmly believe, and which has been proved by extensive tests, to be the finest of all obtainable automatic equipment." Now to be marketed widely for the first time, the Anthratherm has been sold and used exclusively in the anthracite region for some years. Hudson will offer retailers a full promotion campaign, including servicemen training, initial installation supervision, advertising materials, etc.

### $100,000 Aggregate Plant To Be Built at W. Va. Mine

Construction was begun Dec. 7 of a $100,000 plant at Ceredo, W. Va., designed to process refuse from the Ceredo preparation plant of the Truax-Traer Coal Co. into aggregate for concrete and concrete blocks. Builder of the plant, the newly organized Trulite Corp., is headed by Charles N. Howard, formerly with Traux-Traer, who developed the process in co-operation with the USBM. Operating under a lease agreement with Traux-Traer, the operation will initially produce 40,000 tons of aggregate annually and plans a later expansion to 150,000 tons a year. The plant will be the first of its kind in the U. S. and the

## Retiring Officials Serve P&R For 246 Yr

**FIVE OFFICIALS of the Philadelphia & Reading Coal & Iron Co., Pottsville, Pa., who retired on pension at the end of November, had a combined record of 246 yr of service to the mining firm. Four of them shown above were: D. L. Freiler (left), superintendent, Oak Hill colliery, 34 yr of service; J. D. Smith, Mechanical Engineering Dept., 40 yr; L. D. Lamont, mechanical engineer, 50 yr; and V. Robert Freiler, Purchasing Dept., 50 yr. The fifth, John A. Dwyer, with the company for 52 yr and purchasing agent for the last 25 yr, was not present when the photo was taken.**

"light aggregate" produced will have a decided advantage over cinders since the blocks made are lighter in weight and have higher strength and more uniform texture, Mr. Howard reported.

### American Coal Co. Marks 100th Yr of Operation

The American Coal Co. of Allegany County, with operating headquarters at McComas, W. Va., has passed the unusual milestone of 100 yr of continuous mining operation, one of the few companies in the coal industry to achieve such a record. It first began operations in the Georges Creek section of Maryland at a time when it was not unusual to have to shut down mining because of trouble with the Indians. When, after 54 yr of mining in Maryland brought coal reserves near depletion, the company purchased several mining firms with a large acreage of Pocahontas coal in Mercer and Wyoming counties, West Virginia. Today it operates three mines in the Pocahontas No. 3 seam with a total capacity of some 4,000 tons daily, and its newest property, the Deerfield mine, has reserves estimated at 40 to 50 yr. Control of the company was acquired in 1920 by William C. Atwater & Co., which is exclusive sales agent for the coal marketed under the "Atwater Pocahontas" trademark. Harry F. Warden is president of the company and Harry W. Payne is general manager.

### No Federal Funds for Anthracite Drainage Now

The federal government has turned down a proposal for the use of $1½ million in disaster funds for work on anthracite mine drainage, W. J. Clements, Pennsylvania Secretary of Mines, reported Dec. 8. Mr. Clements reported that Felix Wormser, Assistant Secretary of the Interior, had written him that "no legal way" could be found in Washington to provide the money right away and that "apparently the only possible way to obtain funds is through an Act of Congress establishing a federal aid program." Before the election both the federal and Pennsylvania state administrations had pledged action on the anthracite drainage program. It was announced that the President had approved asking Congress for $8,500,000 in federal aid, which would be matched by the state, and that since the state's current drainage funds were exhausted federal officials would seek to make an advance of $1,500,000 immediately available to continue present projects.

### Peabody Coal Optimistic, Planning Mine Expansion

The future outlook of the Peabody Coal Co. is optimistic and the company is planning the opening of a large new coal field within 5 yr, Otto Gressens, Peabody president, and R. J. Snider, financial vice president, told a meeting of the Investment Analysis Society of Chicago early in December. The company is banking on the big industrial expansion predicted for the Mid West, Mr. Gressens said, and is making extensive engineering studies for the opening in the "not too distant future" of 42,000 acres of coal reserves which Peabody owns or has under option in Washington and Randolph counties, Illinois. The reserves are estimated at 250 to 400 million tons, in a seam ranging from 6 to 8 ft thick that would permit use of continuous-mining machines with an output of 35 tpm. The company hopes to be again producing 14 to 15 million tons annually within 5 yr, compared with the 1954 output of about 8 million and the 1953 production of 11 million. The company now has completed its program of closing or curtailing marginal operations, it was reportedly pointed out, and practically all future operations are being planned for barge transportation of coal to beat high rail costs.

## *AGE to Add New Generating Unit; Also Buys Land for Future Ohio Plant*

Plans for continued expansion of the American Gas & Electric Co. System by the construction of a new 225,000-kw steam-electric generating unit were announced Dec. 9—the second such announcement within the past 11 wk.

The unit will be built at the Muskingum River plant of the Ohio Power Co., near Beverly, Ohio, the newest station on the AGE System and one of the world's most efficient producers of electric power. Construction of the unit, which will cost an estimated $29,600,000, is expected to start this month and is scheduled for completion about December, 1956.

The addition will increase Muskingum's generating capability by more than 50%, raising it to 655,000 kw and making it the largest of AGE's 12 major power plants. It is expected that the new Muskingum unit will burn 575,000 tons of coal a year, raising the total annual coal requirements of the entire three-unit plant to 1,700,000 tons.

Earlier, on Nov. 29, the Ohio Power Co. announced that it is acquiring approximately 650 acres of land along the Ohio River near Ironton, Ohio, as the site of a future 1,000,000-kw steam-electric generating plant.

Philip Sporn, president of Ohio Power and its parent company, the American Gas & Electric Co., said that construction of the new plant would be undertaken when the demand for electric service called for additional expansion of its facilities and pointed out that the Ironton site was chosen for two principle reasons: its proximity to coal reserves and its location close to the center of the AGE System's seven-state service territory. The proposed plant will be the sixth major power generating station to be built for the AGE system since World War II, four on the Ohio River.

### MEETINGS

AIME: Annual Meeting, Feb. 14-17, Conrad Hilton Hotel, Chicago.

American Mining Congress: Coal Convention and Exposition, May 16-19, Cleveland, Ohio

### EG&FA Honors 221 Workers For 20 to 40 Yr of Service

More than 5,000 yr of working in the mines of West Virginia and Pennsylvania are represented by 221 Eastern Gas & Fuel Associates mine workers who, in 1954, completed from 20 to 40 yr of service with Eastern and predecessor mining organizations. The awards have just been announced by D. C. Stewart, manager, EG&FA Coal Div., industrial relations department. Each veteran worker receives a gold lapel pin or button bearing his years of service and a gem. The 1954 award winners represent about one-fifth of Eastern's veteran workers with from 20 to more than 50 yr of service, since emblems are presented every 5 yr up to 30 yr of service.

### Knoxville Picked for 1955 National Safety Contest

The 17th National First Aid and Mine Rescue Contest will be held in Knoxville, Tenn., in October, 1955, Secretary of the Interior Douglas McKay has announced. Selection of Knoxville was made at a meeting of the general committee, which is made up of representatives of state mining agencies, the American Mining Congress, coal mine operators' associations, the UMWA, USBM, insurance companies and other organizations interested in safety in the mineral industries.

The contest will be held at Chilowee Park, which has ample facilities for both indoor and outdoor events. At its close there will be a banquet at which prizes will be awarded to the winning teams. Although most of the competing teams in recent years have come from coal mining areas, the contest is also open to teams representing other sectors of the mineral industries. The contests often are referred to as "the World's Series of Safety," because many of the teams entered are winners of their company, county, district and state contests. However, the committee has decided that teams representing any company, association or union active in any branch of the mineral industries will be eligible to compete at Knoxville. Fort Wayne, Ind., was the scene of the last contest, held in October, 1953.

### *And For Your Information . . . .*

**Some 64 mines were closed** by the West Virginia Department of Mines in October "for dangerous conditions" and violations of the state's safety law. Since that time 30 of the mines had been permitted to re-open after elimination of the unsafe conditions, Frank B. King, mines chief, reported Dec. 15. From May through October the department

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shut down 250 properties for safety reasons, he stated.

**The Badgett Mine Stripping Corp., Madisonville, Ky.,** was low bidder for an earthmoving contract in the first project of the U. S. phase of the St. Lawrence Seaway announced Dec. 16. Its bid of $1,372,800 for moving 3,880,000 cu yd of earth near Massena, N. Y., was less than half the government estimate. The bid must be reviewed and approved by the U. S. Corps of Engineers and the St. Lawrence Seaway Development Corp. before the contract is awarded.

**The 450 employees of the Springdale mine** of the Allegheny Pittsburgh Coal Co. were honored at a rally held Nov. 27 at Plum Township (Pa.) High School in recognition of their 100% attendance and completion of the USBM accident prevention course. J. M. Connor, vice president in charge of operations, served as chairman and speakers included various other company, state and federal officials. More than 850 employees, members of their families and friends attended the event.

**The first Christmas trees to be harvested** from coal strip-mine areas in southern Illinois last month decorated the observation cars of five streamliners of the Illinois Central R.R. The trees were among the first to be shipped from a planting of a half-million young trees on marginal and stripped lands in the area. The project was sponsored by state and federal forestry departments, Illinois Coal Strippers' Association, United Electric Coal Cos.; University of Illinois, Southern Illinois University, and the Illinois Central R.R.

(*Continued on p 134*)

# Coal "Minute Men" Battle Oil Advocates, Win Indianapolis School Contract for Coal

As a result of a "mission accomplished" by a group of producer-retailer "Minute Men," new coal-burning equipment will be installed in the Indianapolis Arsenal Technical Schools, retaining a market for 3,000 tons of coal annually. Success of the project is credited to a group of coal men who distinguished themselves by their tenacity in overcoming competition through expert use of the "Total Selling" technique.

The fight for coal began last February when the school authorities decided to replace the school's obsolete coal-burning equipment and consider changing fuels. They turned the project over to a firm of consulting engineers who were not only inclined toward oil but not interested in hearing coal's story. Coal's advocates at that stage were Frank W. Harper, executive secretary, Indianapolis Coal Merchants' Association, and Don B. Bradley, NCA regional manager. They sought reinforcements by bringing in representatives of two stoker manufacturers to make preliminary surveys and then organized a "Minute Men" committee of producers and retailers. Ortho L. Scales, vice president, Enos Coal Mining Co., and member of NCA's Market Promotion Committee, chairmanned the group, which included Roy E. Dean, assistant to president, Ayrshire Collieries Corp.; Walter R. Schott, assistant vice president and sales manager of Enos; Max A. Tuttle, Enos combustion engineer; Wayne M. Yeknik, combustion engineer, Republic Coal & Coke Co.; and Evert A. Johnson, president, Indianapolis Coal Merchants' Association.

The plant was surveyed and recommendations were made for rebuilding one boiler and replacing two others. Fuel, equipment, installation and maintenance costs were established, showing that many thousands of dollars of taxpayers' money could be saved annually over the cost of a comparable oil installation. The "Minute Men" did such a good job of presenting their story to the school board's building committee that the oil-equipment people asked for a second hearing to rebuild their case. The second hearing failed to shake coal's position and the school board has now announced its acceptance of the building committee's recommendation for modernization of the plant with coal.

## Labor Dept. to Set Minimum Wages for Mining Federal Coal

Secretary of Labor James P. Mitchell announced Dec. 17 that proceedings would be initiated at once to determine the prevailing minimum wages in the bituminous coal industry for application under the Walsh-Healey Public Contracts Act. Secretary Mitchell said he was taking the action in response to requests made by John L. Lewis, UMWA president; George H. Love, president, Pittsburgh Consolidation Coal Co.; and A. R. Matthews, president, Pocahontas Fuel Co., Inc.

The Walsh-Healey Act provides for minimum wage and other labor standards and authorizes the Secretary of Labor to determine the prevailing minimum wages that must be paid to all workers employed in the manufacture of or furnishing of materials and supplies under government contracts in excess of $10,000.

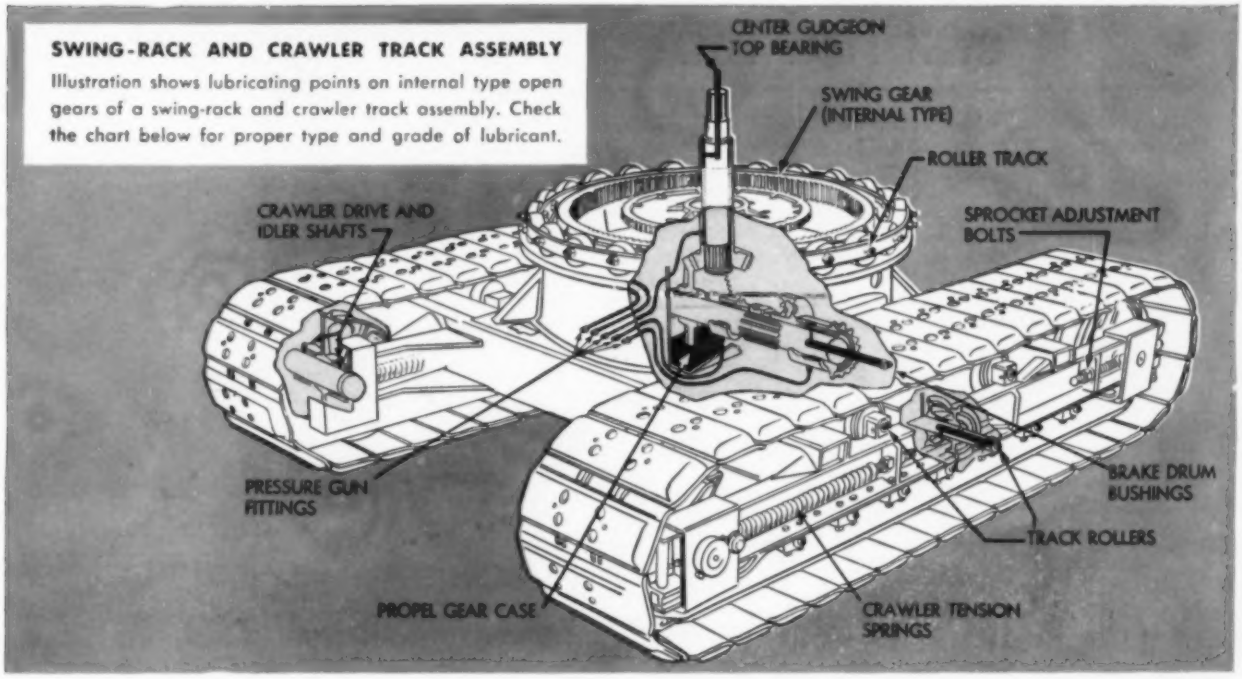
Secretary Mitchell said that although the Act had been in effect for 18 yr no minimum wage determination has been made in the coal industry. "Because of the deterioration which has taken place in the coal industry during the past few years it is necessary at this time, in the interest of preventing further weakening of the coal industry, to see that the fair minimum wage standards required by the Act are applied to government purchases of coal," the Secretary said.

During the fiscal year 1954 the federal government let 714 contracts calling for delivery of $95,693,000 worth of soft coal and coke. During the first quarter of the fiscal year 1955, the government purchased $25,443,000 worth of coal and coke under 347 contracts.

**NEWSWORTHY ACTIVITIES of your company are interesting to other Coal Age readers, so tell us about them. Write The Editor, Coal Age, 330 W. 42nd St., New York 36, N. Y.**

## *French Delegation Tours U. S. Coal Mines*

**SEVEN REPRESENTATIVES of the French coal mining industry pose with three officials of the Red Jacket Coal Corp., Red Jacket, W. Va., following an inspection of the company's underground and preparation plant operations. The group was part of a 12-man team making a 5-wk tour of various producing areas in October and November to study American management and operating methods and problems. Shown above are, kneeling, Guy Duriot (left), Bordeaux; C. P. Ferguson, Red Jacket preparation manager; Michel Curtis, interpreter; Jean LaGabrielle, Bethune; and W. A. Hall, bus driver for the group. Standing—Michel Doerr (left), Paris; J. J. Plasky, Red Jacket training and safety director; E. F. Burch, Red Jacket preparation engineer; Paul LaGache, Somain; Marcel Jolfre, Nantes; and Andre Vanacker, Paris, chief of the mission.**

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|---|---|---|---|---|
| CRAWLER MECHANISM— Track rollers, idlers, track wheels, etc. | | | | |
| Oliver: | Track Wheel System | Trojan Gear Oil | #90 | #140 |
| Allis-Chalmers: | Positive Seal Units | Trojan Grease | P-0 | P-0 |
| Others— | | | | |
| Grease Lubricated: | Pressure gun fittings | Trojan Grease | A-0 | A-1 |
| | Pressure gun fittings | Trojan Grease | F-3-0 | F-2-0 |
| Oil Lubricated: | Hand gun or other means | Trojan Gear Oil | #90 | #90 to #250 |
| GEAR DRIVES— | | | | |
| Open: Normal Condition | By brush or other means | Cisco Compound | #3-Z | #5-Z |
| Dusty Condition | By brush or bath | Raven Oil | #3 | #7 |
| Enclosed: | Bath | Trojan Gear Oil | #90 | #140 |

# Personal Notes

**Kenneth Snarr,** general manager of the Miners Coal Co., Madisonville, Ky., Uniontown Coal Mining Co., Uniontown, Ky., and Williams Coal Co., Manningtton, Ky., has been elected president of the three companies. The appointment was announced Dec. 13 by Justin Potter, president of the Nashville Coal Co. and chairman of the boards of the firms, who also reported that the three companies would be consolidated in the near future. The new company's annual output of 3,000,000 tons will make it the largest producer in Kentucky, Mr. Potter pointed out.

**John McGreavey,** mine manager, Zeigler No. 3 mine, Bell & Zoller Coal Co., Zeigler, Ill., retired last month after 52 yr of service in coal mines without a lost-time accident. Mr. McGreavey first went to work for the Bell & Zoller organization in 1907 as a hand-loader and has served the company continuously since that time except for a 5-mo period in 1936.

Transfer of three mine supervisors of the Pocahontas Fuel Co., Inc., Pocahontas, Va., was announced Dec. 1 by A. V. Sproles, vice president in charge of operations. **Richard J. Baugh,** assistant superintendent of the company's Itmann mine, has been appointed superintendent of its Amonate mine, and **Howard H. Morefield,** formerly general mine foreman at Itmann, has been made assistant superintendent at Amonate mine. **Grover L. Asbury,** assistant superintendent at Bishop mine, has been transferred to assistant superintendent at Itmann, succeeding Mr. Baugh. With Pocahontas Fuel since 1930, Mr. Baugh served as section foreman at Bishop from 1947 until January, 1950, when he became general mine foreman at Itmann, and was promoted to assistant superintendent in May, 1953. Mr. Morefield joined the company in 1932 and held various posts at the Amonate mine until his transfer to Itmann on May 1, 1953, as general mine foreman. Mr. Asbury, a 1949 graduate of West Virginia University with a BS degree in mining engineering, has worked for Pocahontas Fuel since 1939, except for 3 yr in the army and the period he attended the university. He has been assistant superintendent at Bishop since May 1, 1953.

**Richard A. Mullins** has been named preparation manager, Enos Coal Mining Co., Oakland City, Ind., succeeding the late **Wm. Caler.** He also will serve as

*(Continued on p 121)*

## Hicks Retires as Columbia-Geneva Steel Official

**FRANK V. HICKS (left), retired Nov. 30 as general superintendent of coal mines and quarries for U. S. Steel's Columbia-Geneva Steel Div., Dragerton, Utah. He has been succeeded by Robert M. von Storch (right), formerly superintendent of the division's Columbia coal mine. James Cassano, previously supervisor of Industrial Relations—Mines and Quarries, has replaced Mr. von Storch as superintendent at the Columbia mine. A graduate of the Michigan College of Mines in 1915, Mr. Hicks entered coal mining in 1919 with the Union Pacific Coal Co. In 1942 he joined a Chicago consulting firm developing the Geneva mine for the government and became its superintendent when the mine started production. He remained with U. S. Steel when it purchased the Geneva works from the government and had served as general superintendent since 1946. Mr. von Storch, a native of Scranton, Pa., joined The Hudson Coal Co. following study at Pennsylvania State College. He was superintendent of Hudson Coal's Loree Div. when he came to Utah as superintendent of the Columbia mine in the Fall of 1953.**

## New Ayrshire Vice President

**RICHARD H. SWALLOW, chief engineer of the Ayrshire group of companies, has been elected vice president and chief engineer, Ayrshire Collieries Corp., Indianapolis. A graduate of the University of Wisconsin, Mr. Swallow has been with Ayrshire and its predecessors since 1937 and has served as chief engineer since 1940, except for a leave of absence when he was with the U. S. Coal Mission to Great Britain to assist in the development of open-cast mining in England. One of the largest bituminous producers in the Mid-West, the Ayrshire group operates five mines in Indiana, three in Illinois and is currently developing a new mine in Kentucky.**

## Preparation Facilities

**Green Coal Co., Owensboro, Ky.**—Contract closed with Fuel Process Co. for one 160-in Angle Duplex Belknap coal washer with dewatering, desludging and recovery system, to wash approximately 200 tph of 4½x1¼ coal. Contract also includes part of the raw-coal conveying system.

**Pennsylvania Coal Dredging Co., Easton, Pa.**—Shipment by Deister Concentrator Co. of two SuperDuty Diagonal-Deck No. 7 coal-washing tables for cleaning anthracite barley.

**Minersville Coal Co., Inc., Minersville, Pa.**—Shipment by Deister Concentrator Co. of one SuperDuty Diagonal-Deck No. 7 coal-washing table for cleaning barley.

**Freeman Coal Mining Corp., Mine No. 4, Marion, Ill.**—Contract closed with Jeffrey Mfg. Co. for two-compartment five-cell Baum jig; capacity, 210 tph, 7x0 raw feed.

**Powhatan Mining Co., Mine No. 1, Powhatan Point, Ohio**—Contract closed with Jeffrey Mfg. Co. for conveying and crushing equipment; capacity, 250 tph, 8x1¼ clean coal.

5 yr in atomic-energy research on the

tary and treasurer, H. S. Homan. Direc-

Ireland, Richard James Jr., Richard Mar-

### Gerow Opens Consulting Firm

**THERON G. GEROW, former president of the West Virginia Coal & Coke Corp., last month announced the opening of an office at 307 N. Michigan Ave., Chicago 1, as a mining consultant and engineer specializing in strip mining, planning and plant layout, coal preparation, operations and river-coal loading and unloading terminals. Mr. Gerow served as president of West Virginia Coal & Coke from 1951 until last fall when he resigned following a change in stockholder control. Previously he had been with the Truax-Traer Coal Co. since 1927 as chief engineer and vice president, and was executive vice president of the company when he joined West Virginia Coal & Coke.**

preparation manager for Enoco Collieries, Inc., Vincennes, Ind. Mr. Mullins formerly was chief chemist for the Ayrshire Collieries Corp., at Danville, Ill.

**Anthony E. Pagnotta** has been appointed general mine foreman of the Allen mine of the Colorado Fuel & Iron Corp., Weston, Colo., succeeding the late **Leonard C. Ford.** Replacing Mr. Pagnotta as foreman of the Allen mine West portal is **Frederick Guigli,** previously assistant foreman. With CF&I since 1933, Mr. Pagnotta was superintendent of the Kebler and Pictou mines from 1951 until early in 1954 when both mines were closed and he was transferred to Allen. Mr. Guigli, with the company since 1935, previously was foreman at Kebler mine, becoming assistant at Allen mine in 1953.

**Dr. R. H. Crist** has been put in charge of the coal hydrogenation projects at Charleston and Institute, W. Va., as manager of the Physical Processes Dept., Carbide & Carbon Chemicals Co., a Div. of Union Carbide & Chemical Corp. Dr. Crist has been actively connected with coal hydrogenation and other research and development projects of the department since 1945, joining the group after 5 yr in atomic-energy research on the Manhattan Project.

The appointment of four Kentucky state mine inspectors, effective Dec. 1, was recently announced. Named to the posts were: **Everett Bartley,** Allais, Ky.; **Sam Bates,** Brookside; **Frank H. Rhodes,** Madisonville; and **Warnie Flint Jr.,** McRoberts.

Transfer of several coal mine inspectors in the Mt. Hope, W. Va., branch of the USBM has been reported. **F. H. Henderson,** stationed in Montgomery, has been moved to Summersville, replacing **George M. Reid,** transferred to Morgantown. **Hobart B. Lynch,** formerly at Logan, has been transferred to Montgomery to replace Mr. Henderson. **Elwood Menta** and **Ward R. Vickers,** both of the Welch office, have been moved to Princeton.

## Obituaries

**O. T. Scollon,** 62, preparation engineer, Peale, Peacock & Kerr, Inc., Philadelphia, Pa., died Dec. 5, at his home in Barnesboro, Pa. He was for many years a member of the Extension and Research Committee, Central Pennsylvania Coal Producers' Association.

**Frank Leslie Binford,** 68, founder, and president of the D-A Lubricant Co. for the past 35 yr, died Nov. 16, following a heart attack. A pioneer in the use of laboratory analysis for preventive maintenance, the company, under Mr. Binford's guidance, developed the first semi-fluid track-roller lubricant for crawler-type tractors and other track-mounted equipment. Mr. Binford was a member of the National Association of Manufacturers, serving on the taxation committee for many years.

**Edwin M. Chance,** 69, president of the United Engineers & Constructors, Inc., Philadelphia, died Nov. 26 in University Hospital, Philadelphia. A widely known chemist with various patents on chemical and metallurgical inventions, Mr. Chance was with the Philadelphia & Reading Coal & Iron Co. from 1909 until 1913, when he established his own mining consulting practice in Wilkes-Barre. He became vice president of United Engineers & Constructors in 1928 and had served as president of the company since 1938.


### COAL AGE

COAL AGE was founded in 1911 by the Hill Publishing Co. In 1915 COLLIERY ENGINEER, with which MINES AND MINERALS previously had been consolidated, was absorbed by COAL AGE.

When, in 1917, the Hill Publishing Co. and the McGraw Publishing Co. were consolidated to form the present McGraw-Hill Publishing Co., Inc., COAL AGE became a member of this larger publishing enterprise. On July 1, 1927, the journal was changed from a weekly to a monthly.

During 44 years the editorship has been held successively by Floyd W. Parsons, R. Dawson Hall, C. E. Lesher, John M. Carmody, Sydney A. Hale and Ivan A. Given. The editorial staff of COAL AGE presently consists of: Ivan A. Given, J. H. Edwards, William H. McNeal, Harold Davis and A. E. Flowers.


## Association Activities

### Medaris to Succeed Sturgill

F. M. Medaris, (above) president, Harvey Coal Corp., Harveyton, Ky., has been named executive secretary of the Hazard Coal Operators' Association, succeeding William B. Sturgill, who resigned to become executive vice president of Columbus Mining Sales Co. Mr. Medaris, who will assume his new post around Feb. 1, is a director of Southern Coal Producers' Association and is well-known throughout the industry as a labor negotiator.

### McDowell Heads W. Ky. Group

James P. McDowell was elected president of the Western Kentucky Mining Institute, succeeding William Husk, at a meeting held Nov. 23 at Madisonville, Ky. Other officers elected were: Morton Jones, first vice president; Thomas O. Long, second vice president; Steve Steff, third vice president; and Ira D. Inman, secretary-treasurer. Directors include Mr. Husk, Herman Knight, H. C. Hinton, Moss Patterson, Bradley Sparks, Charles Rodman, Kenneth Snarr, J. A. Minor and Raymond Kirkpatrick.

### Southern Appalachian Group Elects Officers for 1955

At the annual meeting of the Southern Appalachian Coal Operators' Association, held Nov. 22 at Knoxville, Tenn., the following officers were elected: president, C. R. Griffith, Southern Coal & Coke Co.; first vice president, Gordon Bonnyman, Blue Diamond Coal Co.; second vice persident, L. C. Hammock, Straight Fork Coal Co.; executive secre-

tary and treasurer, H. S. Homan. Directors elected included Ray S. Walker, Laddie Coal & Mining Co.; Mr. Bonnyman; H. D. Faust, Mahan-Ellison Coal Corp.; Mr. Griffith; Mr. Hammock; W. C. Hutcheson, Wind Rock Coal & Coke Co. (Warren Haydon, alternate); Ray Thompson, Cumberland Collieries; Fred Loving Jr., New Jellico Coal Co.; W. T. Ray, Meadow Creek Coal Co.; Jacob T. Reams, Clear Fork Coal Co.; C. J. Potter, Rochester & Pittsburgh Coal Co.; and J. O. Archer, Blue Diamond Coal Co.

### Ohio Reclamation Group Meets

The following directors were re-elected at the annual meeting of the Ohio Reclamation Association, held Nov. 23, at Columbus: James Benedict, Ernest Bruns, W. M. Burgoyne, Layton DeLauter, R. L. Ireland, Richard James Jr., Richard Marshall, Frank Morrow, Miller Munjas and Clyde Wallick. Newly elected were Charles Atha, Blue Crystal Mines; and Ted Sidwell, Sidwell Brothers Coal Co. The present officers were re-elected to continue in 1955.

### Officers Re-Elected 8th Year

At a recent meeting of the board of directors of the Central Pennsylvania Open Pit Mining Association, held at Philipsburg, Pa., the following officers were re-elected for the eighth consecutive year: president, J. H. Wallin; vice president, B. M. DuBois; treasurer, Herman S. Moore; secretary, R. S. Walker. Three new directors also were elected: Benson Lingle, Arthur Rydberg and Rembrandt Woolridge.

### EQUIPMENT APPROVALS

**Two approvals of permissible equipment were issued by the U. S. Bureau of Mines in November, as follows:**

**Jeffrey Mfg. Co.—Type MT-67 cable-reel shuttle car; one 10-hp and two 20-hp motors, 500 v, DC; Approval 2-928A; Nov. 3.**

**J. H. Fletcher & Co.—Type DDA-11-C2-R2 track-mounted roof drill; 10-hp motor, 550 v, DC; Approval 2-1025A; Nov. 17.**

# Among the Manufacturers

### Wilmot to Handle New OCC Unit

The Wilmot Engineering Co., Hazleton, Pa., has been given manufacturing and sales rights to the recently announced OCC heavy-media separation vessel (*Coal Age*, December, p 106), Rudolph Schreiber, president of The Ore & Chemical Corp., New York, developers of the unit, has announced. The new vessel, which is said to be so simple that the entire separating process is performed without mechanism or power except that required for lifting the sink from the pool, will be manufactured at Wilmot's White Haven, Pa., plant. According to George L. Wilmot, president of Wilmot Engineering Co., application engineering on the OCC vessel and all sales activities in the North American bituminous and anthracite coal fields will be handled from the company's Hazelton office. Six basic designs have been developed, ranging in capacity up to 400 tph. A commercial-size plant is in operation at White Haven for demonstration and feed-testing purposes.

### United Engineers' President

United Engineers & Constructors Inc., Philadelphia, has elected Henry M. Chance, II, president. A graduate of the Towne Scientific School, University of Pennsylvania, in 1934, Mr. Chance has been associated with the company for the past 18 yr, starting as a design engineer. Since 1949 he has been vice president and a director.

### Allis-Chalmers Advances Two

General Machinery Div., Allis-Chalmers Mfg. Co., Milwaukee, Wis., has appointed G. V. Woody, manager of the Processing Machinery Dept. since 1945, as special assistant to C. W. Schweers, vice president, director of sales. William M. Wallace has been named to succeed Mr. Woody. Joining Allis-Chalmers in 1909, Mr. Woody held various sales posts and previously was manager of the division's Pittsburgh office. Mr. Wallace has held several posts with Allis-Chalmers, including assistant to the vice president of general machinery division.

### Joy Promotes Gehlsen

Joy Mfg. Co., Pittsburgh, has named R. G. Gehlsen manager, Electrical Connector Products, with headquarters in the division's plant in St. Louis, Mo. Mr. Gehlsen has been with the Joy organization, and with Mines Equipment Co., now a part of Joy, since 1945. Graduated from Westinghouse Tech in 1925, Mr. Gehlsen was associated with Westinghouse Electric Corp. for several years and later with Sinclair Coal Co. H. B. Zeppenfeld has been appointed sales manager for the Electrical Connector Div. A graduate of St. Louis University, Mr. Zeppenfeld has been successively procurement manager for Mines Equipment Co. and industrial sales manager for the Joy Electrical Connector Div.



### Top Executive of Marion Shovel

Marion Power Shovel Co., Marion, Ohio, has elected Milton T. Smith vice president and general manager. He was named to a similar post with the Osgood Co., a subsidiary, and was elected a director of both companies. A veteran of long service in the power shovel industry, Mr. Smith previously was associated for 26 yr with the Bucyrus-Erie Co., most recently as vice president in charge of purchases and inventory. Louis E. Wolfson, president and board chairman of Merritt-Chapman & Scott Corp., which recently acquired Marion Power Shovel and its Osgood subsidiary, said Mr. Smith's election to executive and board positions marked a further step in previously announced plans by M-C&S to expand their operations.

### H&P Names Sales Official

Heyl & Patterson, Inc., Pittsburgh, Pa., has appointed A. G. Gilbert manager, Standard Products Sales. In his new position, Mr. Gilbert will have charge of the sales of the standard products sold by Heyl & Patterson to the coal, utility, mining, steel and chemical industries. Prior to joining Heyl & Patterson in 1947 as contracting engineer, he was a sales engineer for Harris Pump & Supply Co.

### G-E Revises Organization

Major changes in General Electric Co.'s organization at the executive office level have been announced by Ralph J. Cordiner, president, and include formation of the Distribution Group composed of the Apparatus Sales Div., the General Electric Supply Co., International General Electric Co. and the General Electric Credit Corp. The Affiliated and Foreign Companies Group is discontinued. Henry V. Erben, executive vice president, has been named group executive in charge of the new Distribution Group, and Robert Paxton, executive vice president succeeds Mr. Erben as group executive in charge of the Apparatus Group. Canadian General Electric Co. becomes a part of the Apparatus Group. John W. Belanger has been elected an executive vice president and as group executive in charge of the In-

*(Continued on p 138)*

## O-B Hanger Puncture Strength Increased 10,000 Volts . . .

ANOTHER MILESTONE in the 50 years of O-B Hanger leadership has been realized with the recent increase in the electrical breakdown strength of O-B Hangers using Dirigo insulation. Previously well above the standard 7,000-volt test requirements, the puncture strength of Dirigo insulation has now been increased by 10,000 volts.

INSULATION IMPROVEMENTS assure you even longer-lasting O-B Hanger wear on both negative and positive trolley lines.

MECHANICAL STRENGTH of Dirigo insulation increased 30 per cent, enabling O-B Hangers to take still heavier punishment.

HIGH RESISTANCE to fungus growth and chemical solvents also stepped up further, contributing to longer hanger life in all types of service.

**Ohio Brass**

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Feeder and Trolley Materials • Control Materials • Trolley Shoes
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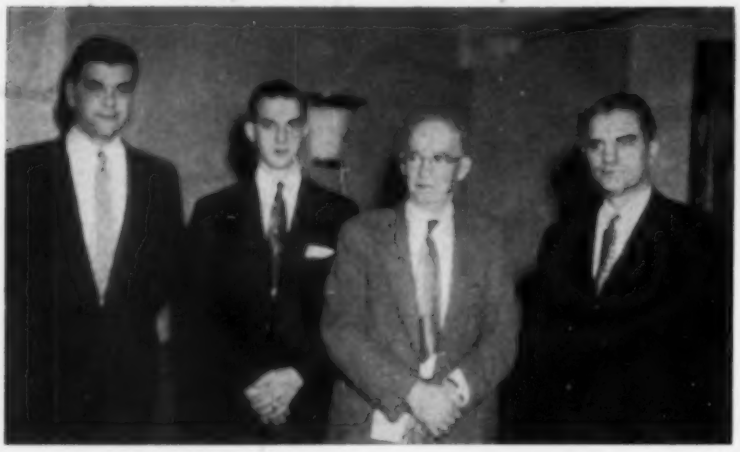


**MINING METHODS**—R. C. Beerbower, Jr. (left), U. S. Steel Corp.; Cleon Fowler, Christopher Coal Co.; W. P. Powers, Pa. Dept. of Mines and institute president-elect; and Stephen Krickovic, Eastern Gas & Fuel Associates. William Eathorne (right photo), health and safety engineer, USBM, demonstrates principles of combustion and control of static electricity applying to underground applications.

## Better mining, improved safety, coal's economic status . . .

# Coal Mining Institute Themes

HAZARDS OF UNDERGROUND GAS STORAGE, operating characteristics of the latest continuous mining machines, safety aspects of roof control, employee safety training, and prevention of coal-dust ignitions in cleaning plants were top themes at the 68th annual meeting of the Coal Mining Institute of America at Pittsburgh, Pa., Dec. 9-10. On Friday afternoon the institute also saw a demonstration on the control of fire and the possible hazards in static electricity.

Officers elected for 1955 are:

President—**W. P. Powers,** mine inspector, Pennsylvania Dept. of Mines, Pittsburgh.

Vice presidents—**J. T. Ryan, Jr.,** president, Mine Safety Appliances Co., Pittsburgh; **J. A. Brookes,** general manager, Pickands, Mather & Co., Mather, Pa.; and **D. C. Jones,** director, Mineral Industries Extension Services, Pennsylvania State University, State College, Pa.

Secretary-treasurer—**J. M. Lowe,** cost accountant, Hillman Coal & Coke Co., Pittsburgh, re-elected.

In his report at the opening business session, Mr. Lowe informed the group that membership had reached a total of 644 with more to be expected during the 2-day meeting and that the institute is financially healthy.

D. C. Jones, reporting for the vocational training committee, pointed out that training trends are somewhat indicative of the state of the industry. There is continuing interest in training programs on mechanical and electrical aspects, but supervisory training and courses designed to prepare men for state certification have been curtailed, both in West Virginia and Pennsylvania. However, training in coal preparation may be expected to expand, Mr. Jones said.

### *INDUSTRY MEETING— A Special COAL AGE Staff-Written Report*

**"It is a source of satisfaction to be able to present a pleasant picture, but this year it is impossible."** This was the theme of the president's address by J. J. Snure, production manager, Rochester & Pittsburgh Coal Co., Indiana, Pa., and retiring institute president. Coal faces one of the worst situations in its history, it has been priced out of a great portion of its market and finds stiff competition from imported residual oil and gas. For example, new cement plants are turning to oil and gas, and coal's share in the total energy market is becoming progressively smaller.

Turning his attention to possible aid for the industry, Mr. Snure advised action by the several interested parties, as follows:

Manufacturers of mining equipment must accelerate the development of ideas and improvements to the point of getting ahead and keeping ahead of demands for higher wages.

Government may help by taking corrective measures regarding the importation of residual oil, and there is no need for emergency wage raises, nurtured by the government during the late hostilities, to continue to harass the industry when the emergency is past.

Workers must play on the team and finally realize their jobs may be at stake. They must desist in tightening seniority rules and permit some system of recognizing qualifications.

Officials must not be content with average performance of their own duties. Of course, training is a management function, but officials must do some thinking about their own training.

The UMWA must be careful not to force conditions with which the industry cannot live.

Consumers must be prepared to pay realistic prices for their fuels.

Management must control pricing in a proper manner, pursue research in handling and combustion, and search out new uses in new fields.

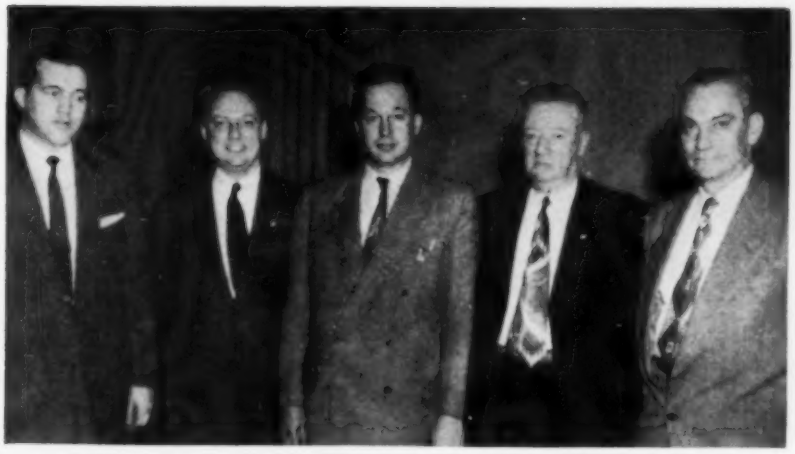
**"We might as well be frank about it. TVA, intentionally or unintentionally is engaged in a union-breaking operation,"** Joseph E. Moody, president, Southern Coal Producers Association, Washington, D. C., charged in his featured address at the annual banquet on Thursday evening. TVA buying policies have forced private utilities competing with TVA to buy from producers who are paying less than the union scale, Mr. Moody continued, in pointing out that such practices disrupt the entire utility market for coal and that Congress should see that TVA pays a fair and reasonable price for its coal.

It appears also that the importation of residual oil is one part of the plan of a world-wide oil cartel to divide the world market for oil, Mr. Moody declared. However, in spite of these major problems, coal is a dynamic, growing industry, but coal operators must work together toward the bright future, rather than merely wait for it.

Mr. Snure presided at the banquet and Henry C. Rose, president, Pittsburgh Coal Co., Div. of Pittsburgh Consolidation Coal Co., Library, Pa., was toastmaster.

### UNDERGROUND GAS STORAGE

**Granting that the natural-gas industry is vital in serving the nation's**



**ROOF CONTROL, SAFETY**—M. F. Florjancic (left), Mathies Coal Co.; J. T. Ryan, Jr., Mine Safety Appliances Co.; J. S. Whittaker, Pittsburgh Coal Co.; Andrew Wilson, Pa. Dept. of Mines; and W. G. Cooper, U. S. Bureau of Mines.

**fuel needs**, J. W. Woomer, president J. W. Woomer & Associates, Wheeling, W. Va., and Pittsburgh, stated in the closing talk of the Thursday-morning session that even the remotest possibility of leakage is sufficient to justify the removal for safety reasons of any storage pool underlying active coal mines. Noting that both the gas and coal industries have problems arising from the activities of the other, Mr. Woomer declared it is time for an objective approach to these problems by both. The gas companies, in turning to underground storage, have large investments at stake, but the overriding concern of the coal operators is the possibility of accident, perhaps with catastrophic results.

Since the gas is stored under pressures up to 600 psi, Mr. Woomer pointed out that there is no practical possibility of ventilating a point in a mine with sufficient volumes of air to dilute the gas flowing from a leak under such pressure. A 1-in leak could admit 6,500 cfm of gas at this pressure, with dilution to 1% requiring 650,000 cfm of fresh air. Uncharted wells, limited knowledge of gas-migration tendencies, structural subsidence and lack of definite knowledge of the condition of inaccessible well pillars in coal mines make it almost impossible for anyone to predict the behavior of the stored gas. Such uncertainties create much of the mining companies' concern for their property and employees, Mr. Woomer said.

"It seems, therefore, that while current honest attempts to draft mutually-acceptable legislation are commendable," Mr. Woomer concluded, "the physical and mechanical problems involved and the presence of even one in a thousand chances of a mine catastrophe dooms the possibility of saving storage pools, which unhappily have been created under operating mines."

## NEW MINING METHODS

Experiences in the application of Marietta and Konnerth mining machines and a report on roof action in planer mining were features of the Thursday-afternoon session. Cleon Fowler, superintendent, Osage mine, Christopher Coal Co., Pursglove, W. Va., described the Marietta machine; Stephen Krickovic, chief engineer, Eastern Gas & Fuel Associates, Pittsburgh, presented the theory of roof action at his company's planer sections, and R. C. Beerbower, Jr., superintendent, Karen mine, U. S. Steel Corp., Uniontown, Pa., reported on the Konnerth miner. Mr. Powers, president-elect of the institute, presided.

**The machine in use at Osage mine was modified by the installation of two 70-hp motors instead of the 70- and 25-hp motors** on similar units working in Illinois coal, Mr. Fowler said, and larger hydraulic pumps were substituted to provide adequate power for the several functions of the machine. Other changes included the replacement of a disc-type clutch with a jaw-type clutch, the development of stronger tool holders, and changes in core breakers. The cutting arms are retractable through a screw arrangement, rather than a folding arrangement. Such changes were made to better adapt the machine to conditions in the Pittsburgh seam, Mr. Fowler explained.

Original selection of the Marietta was based upon the facts that the cleaning plant does not wash minus ⅜-in coal, that Christopher management prefers a minimum number of sections with high-tonnage units and that better roof support might be expected as a result of the Marietta's circular mining pattern. Generally, these expectations have been met. Roof conditions in Marietta-mined sections are good; size consist averages 53% minus ⅜ against 45% minus ⅜ with conventional mining, a figure capable of favorable adjustment with changes in the cutting elements; and 6-man crews have produced as much as 800 tpd.

First application of the machine was in a 250x1,800-ft solid block of coal under 150 ft of cover, using a pickup loader and shuttle-car haulage to a 30-in entry belt. It was found that right-angle places could be turned, but efficiency was increased when 60 deg turns were the rule. Recovery was 60% of the coal in place.

Bit costs varied from 4c per ton to 13.9c per ton, depending upon the sulfur conditions encountered. A Brinnel hardness of 300 in the sulfur inclusions is about the economic limit of operations, Mr. Fowler said. Experience indicates that the machine still is somewhat underpowered, and could perhaps use two 100-hp motors instead of the two 70-hp motors now employed.

**The pressure-arch theory appears to be a logical explanation of roof action in two planer-mining panels in the Pocahontas No. 4 seam at Stotesbury No. 8 mine,** Mr. Krickovic said, in explaining possible causes of phenomena observed during the work. Recorded pressures on roof supports and evidences of pressure ahead of the retreating face generally fulfill the expectations that might be drawn from the theory. Front abutment pressure is noted about 50 ft ahead of the face, and recorders on the jacks show that as roof pressure is transferred to the rear abutment in the gob the pressure in the open face area is somewhat relieved.

Total breakage in the roof appears to occur in three stages; the first in from 4 to 6 ft of immediate roof, the second in the next 20 ft higher up, and the third in the still higher cover. In a rather regular pattern the first fall occurred after from 4 to 8 ft of roof became unsupported, the second fall from 12 to 20 ft back of the gob row of supports, and the final fall at regular intervals of from 60 to 75 ft.

Unusual pressures were encountered while mining under pillars in the Beckley seam, 285 ft above the Pocahontas No. 4. The pressure generated by the pillars in the higher seam carried through the rock interval and was superimposed upon the pressure created by the longwall arch. The result was more rapid subsidence and excessive breakage in the roof. Similarly, the tail entry appeared to come under the influence of double pressures, one from the longwall arch and another from the adjacent gob area, resulting in troublesome bottom heaving in the tailpiece entry.

In spite of these complications, productivity in the second panel was about 30% higher than in the first and about 60% higher than in conventional methods employed in other sections of the mine, Mr. Krickovic concluded.

**After following up the history of the development and design of the Konnerth machine, which employs a combination of undercutting, shearing and vibrating,** Mr. Beerbower reported on experience with the 46,000-lb machine in mining the Pittsburgh seam at U. S. Steel's Karen mine. Cover ranges from 40 to 350 ft in thickness, general dip is about 1½% with local rolls up to 5%, and the seam is overlain with from 10 to 12 in of weak drawslate and from 10 to 12 in of wild coal. The mine is working to the rise.

Twelve Konnerth units now are in service and daily production is about 4,000 tons. The standard crew is made up of four men, including an operator and three helpers who perform all duties

in the face cycle. One foreman supervises two units.

The main opening, Mr. Beerbower explained, is an 8-heading main entry having 60-lb rail in the two center headings. A 7-heading butt entry has been turned from the mains with headings and crosscuts on 85-ft centers. Rooms are opened in sets of three 16 ft wide on 85-ft centers by two machines and driven to a length of 1,020 ft with crosscuts also on 85-ft centers. A track is laid in the center heading and loading points are set up at 255-ft intervals. A 3-block lead is maintained between adjacent sets of rooms to establish and control the pillar line.

Roof bolts are installed on 4-ft centers by the unit crew as each opening is advanced, and crew members also drill, tamp and fire single holes in each of the three blocks formed by the machine in making a 16-ft-wide opening. Such shooting is a regular practice in sections where tough coal might require excessive vibrating time.

In summing up, Mr. Beerbower listed some of the advantages of the Konnerth machine as follows:

1. A repetitious cycle permits the assignment of small crews, thus fewer man-hours of exposure and increased safety. Furthermore, the resulting concentration of operations permits better supervision.
2. The Konnerth miner is adaptable to development and pillar extraction in present mining systems because it is maneuverable and compact.
3. Minimum amounts of dust are formed.
4. The machine is designed to load from the floor. Therefore, it makes an effective cleanup.
5. High tons per man and low unit costs have been realized.

### ROOF CONTROL, SAFETY TRAINING

At the Friday-morning session, speakers and their subjects were: Andrew Wilson, mine inspector, Pennsylvania Dept. of Mines, Pittston, Pa., on Pennsylvania's campaign to prevent roof-fall accidents; M. F. Florjancic, Mathies mine, Mathies Coal Co., Finleyville, Pa., and W. G. Cooper, mine inspector, USBM, Pittsburgh, on roof-bolting in pillar-recovery operations; and J. S. Whittaker, general superintendent, Pittsburgh Coal Co., Div. of Pittsburgh Consolidation Coal Co., Library, Pa., on safety training for accident prevention. J. T. Ryan, Jr., vice-president-elect was session chairman.

**Roof falls still account for 60 to 70% of fatalities in the anthracite region,** Mr. Wilson reported, in giving a run-down of contributing conditions, such as multiple seams in varying stages of recovery, faults and fissures in profusion, and pitches ranging from flat to vertical.

Possible corrective measures described by Mr. Wilson, who co-ordinates the roof-fall accident-prevention campaign in the anthracite region, include the following:

1. Closer supervision, which may be expected to result from increased mechanization in anthracite.
2. Roof-bolting in early trials has

*11-RU Universal Cutter, courtesy Joy Manufacturing Co.*

# MORE BITS in the LINE...

# A BETTER FIT in the MINE!

★ 20 Different Styles of Cutter Bits

★ 2 Styles of Finger Bits

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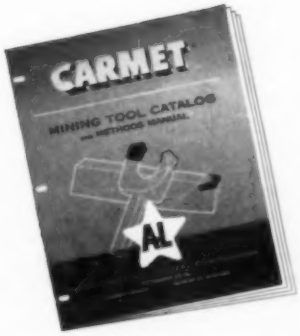


**Write for your copy of the CARMET MINING TOOL CATALOG**

This informative 16-page booklet gives complete data, sizes, etc. on all styles of Carmet carbide-tipped cutter and drill bits. Also included is a valuable methods manual on reconditioning methods and equipment. Your copy gladly sent free on request.

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The unequalled range of selection that is available to you in Carmet carbide-tipped coal cutter and drill bits simply means this: that you can match up your bits just that much more closely with the actual conditions you have!

And *that* means you can profit by the greatest increase in cutting speed and tons cut per bit setting—the greatest reduction in down time and in overall bit cost per ton—that is possible for you to secure *anywhere* with carbide bits. What's more, you have added assurance of top efficiency in the overlaying cap of steel that *double-bonds* the carbide tip of each Carmet cutter bit firmly in its seat. That's a feature which Carmet *originated*. It operates to protect you against tip loss, and to permit cutting on both sides as well as in front—eliminating side drag, reducing power consumption, etc.

Even the shank steel in Carmet carbide bits is a product of quality control: tough enough to insure against bending or breakage, yet of a hardness to permit set screw locking. ● Just *try* Carmet bits—see for yourself what they'll do! We'll be glad to cooperate with you in proving their advantages on *your* job. ***Allegheny Ludlum Steel Corporation, Carmet Division, Wanda and Jarvis Avenues, Detroit 20, Michigan.***

*The Original DOUBLE-BONDED Carbide Bit*

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proved to be helpful. In two parallel chambers driven by duckbills roof bolts have held up the top in one while conventional timbers in the other failed to do the job. Roof bolts also have been effective in stabilizing roof over a continuous-miner opening and in preventing foot-wall slides in deep stripping of steeply-pitching veins.

3. Becorit yielding props have shown promising performance in sections working on complete pillar extraction.

4. Longhole mining may reduce the number of roof-fall accidents because men will be working under positive protection.

Complicating factors, Mr. Wilson said, are the large numbers of "bootleg" operations, operated in substandard fashion, and the extensive shooting off-the-solid which must be done. The latter practice results in the dislodgment of many supports, but Inspector Connelly has made a move toward a solution by requiring that all miners be equipped with steel back-up bars to prevent such dislodgment.

In conclusion, Mr. Wilson dramatized the need for action by pointing out that the percentage of fatalities among all anthracite roof-fall accidents closely approximates the percentage of fatalities among all U. S. casualties in World War II and Korea. The objectives of the enemy in war and our objectives in mining are diametrically opposed, Mr. Wilson said, in declaring that the spread must be made much wider.

**Over 4 million tons have been mined under more than a million roof bolts at Mathies mine since July, 1949,** Mr. Florjancic said, and not a single accident has occurred which can be charged to roof-bolting. Moreover, recovery in pillar areas has been increased 5% since bolting was adopted. The mine is in the 72-in Pittsburgh seam with typical drawslate roof and many clay veins, spars, cutters and other defects.

The practice of bolting in pillar areas was adopted in June, 1953, when the plan of recovery was changed to minimize open-end work in favor of pocket-and-fender operations. Subsequent experience, however, forced a return to open-end recovery with posting on the open end to provide workmen with a feeling of roof security and to provide visible signs of roof action or failure and a definite break-off point.

Good pillar recovery depends upon good development work, Mr. Florjancic declared, in citing approved practices, such as (1) driving places strictly on sights and in predetermined widths, (2) staggering crosscuts and intersections, (3) installing bolts according to a systematic plan, then following up to check the pattern and the torque, and (4) planning for the elimination of development in roof defects wherever possible.

In describing actual bolting methods at Mathies, Mr. Florjancic stated that immediate roof support on posts is vital. This is done as soon as the coal is loaded out. Two rows of posts, 4 ft apart, are set along the open end, then the exposed roof is bolted. The ⅝x48-in bolts are installed 3½ ft apart across the



face with rows 4 ft apart in the 14-ft-

Mine A—Pillars are 75 ft square. Using

butt lift then is taken from the top of

face with rows 4 ft apart in the 14-ft-wide openings. Bearing plates are 6x6x¼-in steel.

Difficult problems occur when clay veins or other roof defects are encountered. Close posting is necessary to prevent roof movement near such defects until the bolts can be installed.

Recovery of bolts from mined-out areas has never been seriously considered, Mr. Florjancic said, because the advantages of faster extraction would be diluted by the time spent in bolt recovery. Furthermore, special equipment would be required and recovery would not exceed 50% of the installed number.

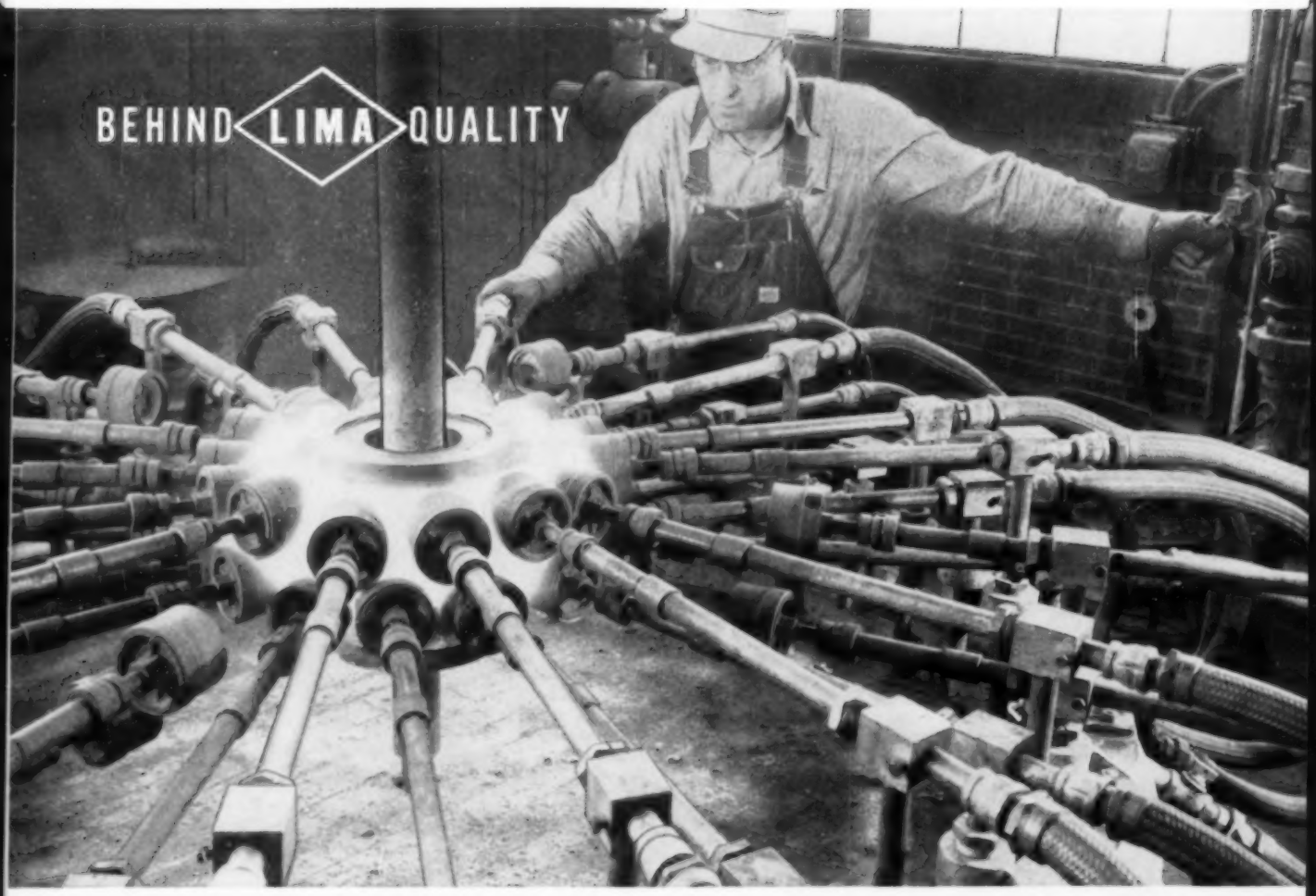
**Roof-bolting in pillar areas in two other mines in the Pittsburgh seam** were described by Mr. Cooper as follows:

**Mine A**—Pillars are 75 ft square. Using pocket-and-fender recovery methods, a 15-ft-wide split is driven through the block near the center, leaving pillars on the left and right of the split that are three and four cuts thick, respectively. These are cut through leaving 5-ft fenders on the gob side, which are taken on retreating out of the split. Small remaining stumps are crushed out when the coal is blasted. Four 5½-ft roof bolts are installed vertically across the opening, and rows of bolts are 4½ ft apart, two rows per cut. The bolts are installed to within 3 ft of the face.

**Mine B**—Pillars are 85x65 ft. Three open-end face lifts of seven cuts each are taken off the back end of a block along the 65-ft dimension. A three-cut butt lift then is taken from the top of the pillar and the remainder is mined as roof dictates, either with a four-cut face lift or two butt lifts. Cuts are 22 ft wide and 9 ft deep. The roof is bolted with five 5-ft split-wedge bolts installed vertically on 4-ft centers across the place, using two rows on 4½-ft centers per cut. In addition, two rows of breaker posts are set on 4-ft centers on the open end.

A variation at Mine B is installing bolts within 1 ft of the rib line in driving the first lift. When the lift is extracted, two rows of breaker posts are set along the open end, leaving a 9-ft roadway between the solid rib and the first row of posts. An 8-ft cut is made along the enure length of the pillar and the coal is shot down. The loading machine starts at the outoy end of the cut and works under the protection of the roof bolts. As the cut is loaded out, another row of posts is set 4 ft from the new solid face, leaving a 13-ft-wide travelway for the shuttle car.

**In describing the 100% accident-prevention training program,** Mr. Whittaker pointed out that sincere interest of management coupled with the right kind of instruction formed the foundation for the successful completion of the training and follow-up improvement in safety performance at mines of the Pittsburgh Coal Co. and Mathies Coal Co. Management pitched in with the construction of temporary steel buildings near the portals to be used as classrooms, and by providing coffee and sandwiches for the men




# Heat treating gives **LIMAS** greater strength and longer service life

In the 1500 degree F. circle, formed by this battery of gas burners, is a shipper shaft pinion destined to become a vital part of a LIMA shovel. This heat, the succeeding water quench and controlled tempering process, establishes a uniform hardness up to two inches in depth to the teeth and teeth base of the pinion. This means longer serviceable life to this important part.

Flame and induction hardening are used on rollers, gears and shafts of every LIMA machine. Heat treating, used with our know-how, is one of the reasons why LIMA is known throughout the world for quality—cost-conscious equipment men everywhere are saying, "you can depend on a LIMA for low maintenance and less down-time."

COMPARE QUALITY! No other machine gives you as much as LIMA!

1. Piston ring type dirt seal rings and retainers in crawler rollers.
2. Moving parts are flame or induction hardened for longer life.
3. Main machinery is placed well back of center of rotation.
4. Anti-friction bearings at every vital bearing point.
5. Big capacity drums and sheaves are easy on cables.
6. Propel and swing gears and power take-off are enclosed in a sealed oil bath.
7. Wherever you are, you can depend on skilled service and nearby warehouse stocks of parts to keep your LIMA on the job continuously.

The above advantages contribute to LIMA'S greater output, less down-time and lower maintenance.

COMPARE and you'll specify LIMA for shovels (¾ yd. to 6 yds.), cranes (to 110 tons) and draglines (variable). Smaller capacities available on rubber.

LIMA Type 2400—6 yd. shovel removing overburden in open pit mine.

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**LIMA** SHOVELS · CRANES · DRAGLINES · PULLSHOVELS

***BALDWIN-LIMA-HAMILTON***

*Construction Equipment Division · LIMA · OHIO · U. S. A.*

coming from the mine, who immediately entered the classes. Instructors J. B. Yanity and W. M. Merritts of the Bureau of Mines scheduled the classes to serve the second shift before their shift started and the first shift after the day's work. Special arrangements were made for the third shift as necessary.

The program was started at a smaller mine, where it was felt that 100% participation could be had and the program would be off to a good start. This proved to be the case, and in the period from Feb. 1 to June 1, 1954, 2,250 men at 8 mines had completed the course.

Refresher sessions have been held at most mines since the initial training was completed.

Concerning results, Mr. Whittaker reported that the combined frequency rate of both companies was 17.96 for the first 10 mo of 1954, against a rate of 22.38 in 1953. This was accomplished in spite of the fact that the training was conducted at a time when the working force was being reduced.

## COAL DUST IN CLEANING PLANTS

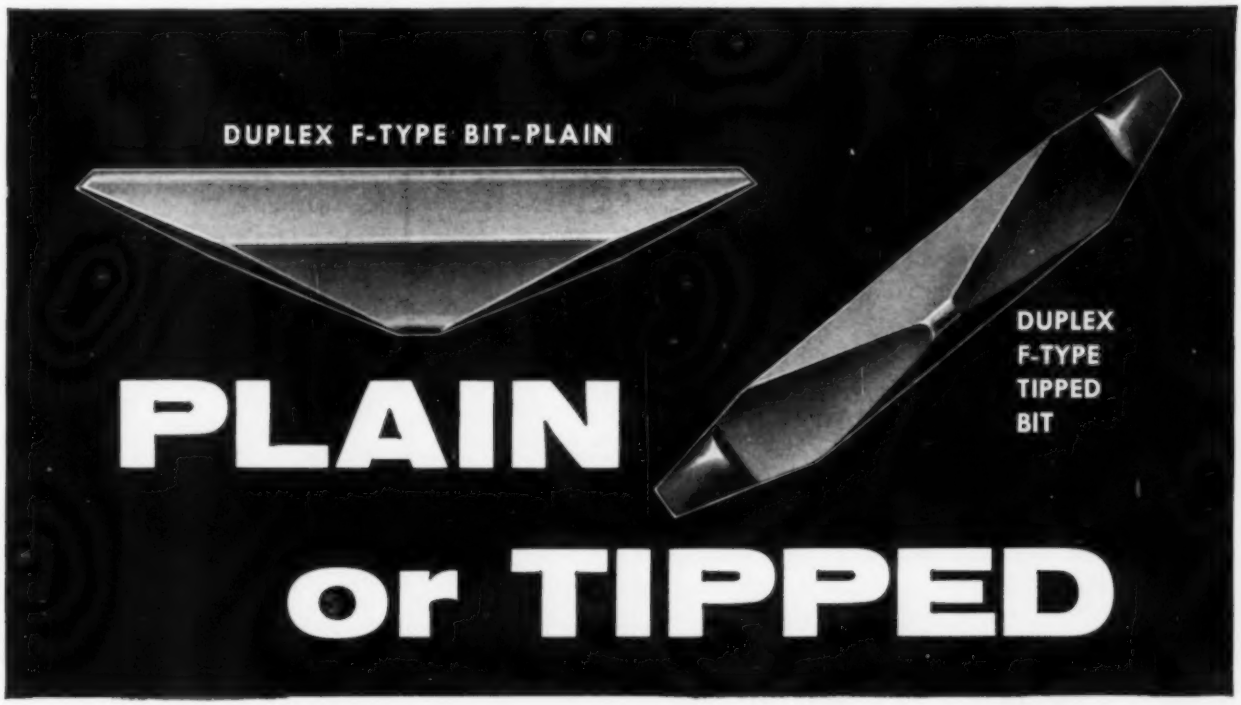
Speakers at the final session on Friday afternoon were Hylton R. Brown, senior engineer, USBM, College Park, Md., and Charles H. Curry, mine inspector, Pennsylvania Dept. of Mines, New Kensington, Pa., on coal-dust ignitions in cleaning plants where coal is dried by artificial heat. A demonstration on the control of fire and the hazards of static electricity, by William Eathorne, health and safety engineer, USBM, Pittsburgh, was the final feature of the 2-day meeting. J. A. Brookes presided.

**As an outgrowth of an explosion at Lucerne cleaning plant in February, 1954,** the Bureau of Mines has undertaken a study of all types of drying equipment and applications in various parts of the country, Mr. Brown said, in explaining that it is hoped some recommendations for safe heat-drying will be forthcoming. The many factors involved have channeled the study into a search for those locations in drying equipment where, because of design or installation, or some combination of conditions during starting, operating or shutting down, dust may accumulate on surfaces hot enough to ignite it, or clouds of dust of explosive concentrations may be formed where sources of ignition are present and the oxygen content in the atmosphere is high enough to support combustion.

To help reduce fires and explosion hazards in driers, operators are urged to see that special attention is given to cleanliness in plants, since the absence of dust accumulations may prevent a serious explosion if puffs or minor ignitions should occur within the drying equipment, Mr. Brown cautioned.

In answer to a question from the floor, Mr. Brown stated that the creation of inert atmospheres within the driers by the introduction of nitrogen or other gases is too costly to be practicable.

**After reviewing the operating characteristics of heat driers,** Mr. Curry turned to safety in operating such units. Noting that several changes had been made in the Lucerne installation, the speaker stressed the importance of keeping the




# the Cincinnati F-Type bit is gaining in popularity

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*"CINCINNATI" OFFERS CUTTING EQUIPMENT TO MEET YOUR SPECIAL NEEDS*

*I LIKE "CINCINNATI" FOR ITS ECONOMY*

ONCE again "Cincinnati" has met the challenge to produce a broader line of bits to provide greater cutting economy and efficiency regardless of your individual cutting problem. Latest in the "Cincinnati" complete line of bits are the DUPLEX F-TYPE PLAIN BIT and the DUPLEX F-TYPE TIPPED BIT. These augment the well-known C-11 Duplex Bit line which has been a favorite in the industry for years.

**THE CINCINNATI DUPLEX F-TYPE PLAIN BIT** gives dependable service under the toughest cutting conditions (where other bits have failed) due to its specially reinforced tip which provides a stronger cutting point.

**THE DUPLEX F-TYPE TIPPED BIT** through an exclusive "Cincinnati" process gives you the most economical throw-away type carbide tipped bit on the market. Where cutting conditions are favorable to tipped bits, "Cincinnati" offers you the lowest cost carbide tipped bit available.

FOR GREATER ECONOMY USE CINCINNATI CHAINS AND BITS MADE TO MEET YOUR SPECIFIC REQUIREMENTS.

*the* **CINCINNATI MINE MACHINERY CO.**
**CINCINNATI 25, OHIO**

that several changes had been made in the Lucerne installation, the speaker stressed the importance of keeping the units in good operating condition and operating them in the prescribed manner. Specific safety proposals advocated by Mr. Curry include the following:

1. The rotary airlock valve must be kept in good repair, since leakage reduces the efficiency of the high-pressure fan, permitting coal to fall to the bottom of the column. This coal may become fire-coked and continue to smolder, thus creating an ignition hazard upon restarting. Flap traps at the bottom of the column might be eliminated to permit the removal of this coal as it falls.

2. Under no condition should the dampers be altered from their original state, but should be maintained in good operating condition.

3. An indicating alarm could be provided to show interruptions in wet-coal feed. The operator then could take steps to prevent overheating of the drier stack. Water should not be introduced into the stack.

4. Where multiple driers are used, Roto-Clone dust collectors should be provided, and where this is not done, separate exhaust ducts to the atmosphere should be provided.

Flash driers can be operated safely, Mr. Curry concluded, if the system is not altered and if the proper operating sequence is strictly observed.

In discussion, Mr. Gordon, manager, Raymond Flash Drier Div., Combustion Engineering Corp., pointed out that manufacturers prefer to keep the equipment as simple as possible, since a great number of auxiliary controls and devices might only increase maintenance problems and operating difficulties. There has been no trouble in 13 other such plants, Mr. Gordon said, and operators are not "sitting on a powder keg" in drying fine coal.

In the final feature, Mr. Eathorne demonstrated the principles of fire control, based upon the fire-producing triangle, which requires the presence of fuel, oxygen and ignition source. Using gas chambers and a static machine, Mr. Eathorne then demonstrated the effectiveness of explosionproof electrical equipment in gassy atmospheres as against the hazards of open equipment. In the control of static discharges, Mr. Eathorne stressed the dangers of haphazard grounding.

## NEWS BRIEFS . . . From p 116

**A coal tipple owned by the River Smokeless Coal Co.,** near Irvone, Pa., was damaged extensively by dynamite during the night of Dec. 10. The tipple had been rented by other companies until that day, when River Smokeless began using it to load its own coal. The company is one of several that over a year ago secured a court injunction against the UMWA prohibiting interference with its mine operation. A $5,000 reward for information leading to the apprehension and conviction of the dynamiters has been offered by the Central Pennsylvania Open Pit Mining Association.





**The Sunday Creek Coal Co., Columbus, Ohio,** recently moved into its new executive headquarters at 875 E. Broad St., in the outlying district of the city.

# Suspended magnet solves tramp iron problem on high-speed conveyor handling wet coal

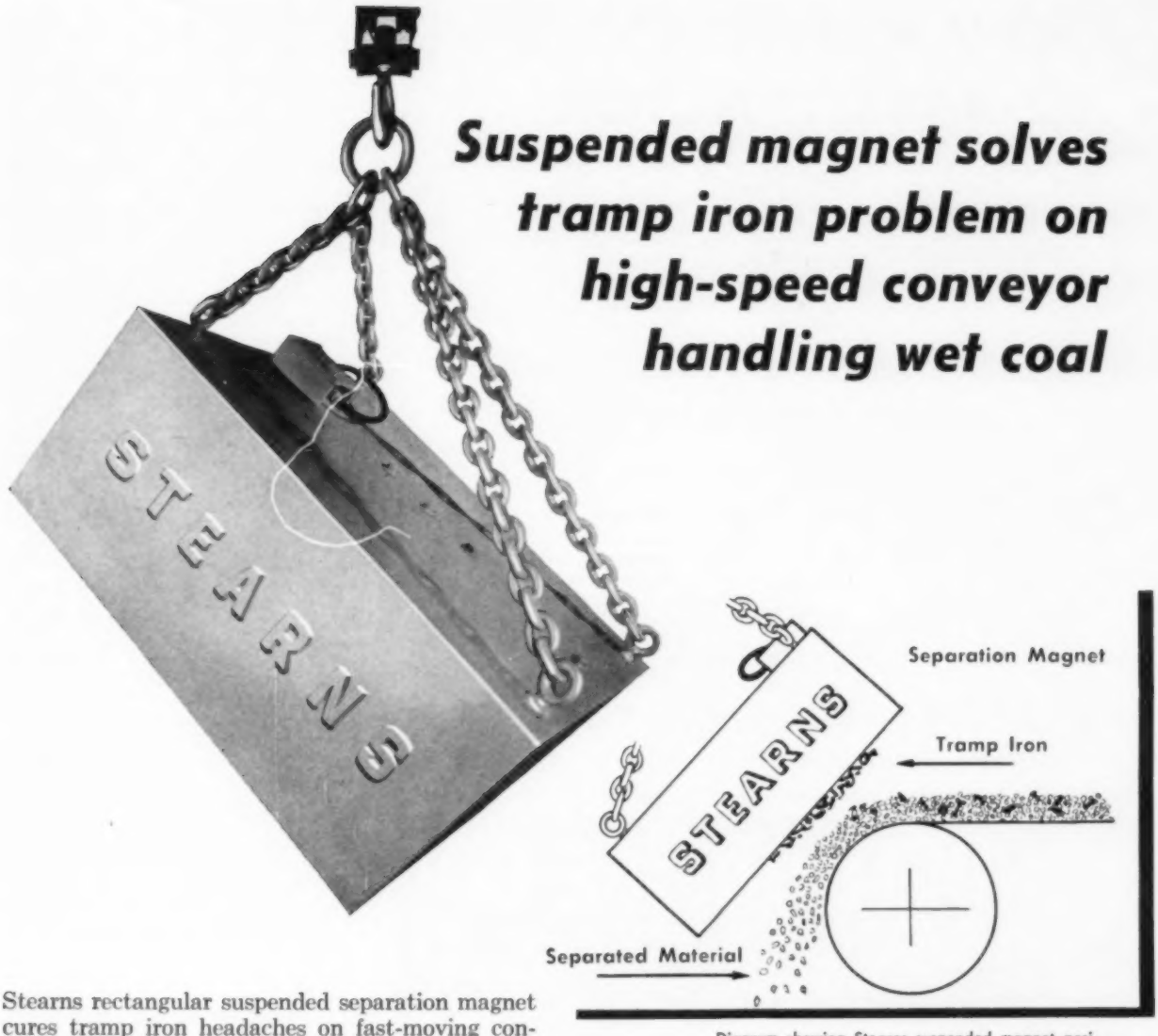



Diagram showing Stearns suspended magnet positioned over head pulley.

Stearns rectangular suspended separation magnet cures tramp iron headaches on fast-moving conveyors, particularly when coal is wet.

First, the magnet's length permits its powerful, deep pulling force to work over a large area . . . dig out embedded tramp iron . . . prevent "sneak throughs." Second, the upward movement of iron to the magnet, shakes off wet, clinging coal, eliminating costly waste.

## *Greater Flexibility*

Stearns suspended magnet overcomes space limitations because it can be placed over the head pulley, or anywhere along the belt. Sometimes it's set up to remove tramp iron before coal moves onto the conveyor — thus safeguarding the belt from damage. In many processing operations, Stearns suspended magnets are used ahead of magnetic pulleys to insure double protection for crushers and other expensive equipment.

## *Custom-Built*

Magnetic specialists at Stearns design and build rectangular or circular suspended magnets, electro or permanent magnetic pulleys in standard sizes, or to your individual specifications. Get complete details from your Stearns representative or write for bulletin 25D.

## *Check these advantages*

- All-welded, moisture-proof construction
- No moving parts that require replacing
- Single coil construction for magnetic field stability
- Leads and terminals fully protected against abrasion
- Vacuum-impregnated windings for long life, dependable operation

MAGNETIC EQUIPMENT FOR ALL INDUSTRY

**STEARNS MAGNETS**

STEARNS MAGNETIC, INC., 661 S. 28th St., Milwaukee 46, Wis.

**The Sunday Creek Coal Co., Columbus, Ohio,** recently moved into its new executive headquarters at 875 E. Broad St., in the outlying district of the city. The new offices are modern in decor throughout the large stone building, with fluorescent lighting, wall-to-wall carpeting and the most up-to-date office furnishings. The company, which celebrated its 75th year in the coal business last March, had been tenants of the Outlook Bldg., in downtown Columbus, since 1900.

**Merger of the Carbon Fuel Co. and Winifrede Collieries,** operating in Kanawha County, West Virginia, has been approved by directors of the two companies, subject to ratification by stockholders late in December. The announcement was made by L. Newton Thomas, president of Carbon Fuel, which operates three mines producing over 1,000,000 tons annually. One of the oldest mining firms in the state, Winifrede Collieries has a mine at Winifrede, W. Va., producing over 200,000 tons a year. Other Winifrede mining interests are not involved, it was reported.

**The Harmon Creek Coal Co., Pittsburgh, Pa.,** was one of nine companies in the general industry classification to receive a national "Plant America" award in the second annual competition of the American Association of Nurserymen. The awards, to be presented at meetings of state nurserymen's associations early in 1955, are made "in recognition of achievement in industrial landscaping and beautification contributing to employee and civic pride in our American Heritage."

**Representatives of the Anthracite Information Bureau** took the industry's story of the advantages of modern anthracite space heating to the government last month, with a 3-day series of conferences attended by 33 federal engineers from various of the major government agencies. The presentation, designed to increase anthracite use by government installations, was arranged in co-operation with the U. S. Department of Commerce.

**Great Britain imported 2,243,600 tons of coal** during the first 45 wk of 1954, compared with 432,700 in the same period of 1953, the National Coal Board reported last month. It currently is buying imported coal at a higher level than ever before, storing it for an anticipated winter fuel shortage and to protect its overseas export markets, a Coal Board Report added. Of the 1954 imports, France supplied approximately 750,000 tons; Belgium, 500,000 tons; United States, 250,000 tons; Poland, 250,000 tons; and West Germany, 250,000 tons.

**1955 Bituminous production will reach 425,000,000 tons,** or about 10% over 1954, Julian L. Tobey, president of Appalachian Coals, Inc., predicted last month to the New York Society of Security Analysts.



How hospitals can save money and ob-

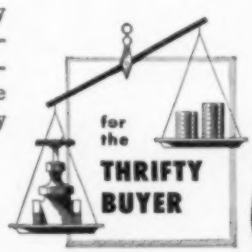

# Hold it!—is it good enough for CRANE VALVES?

What you see here is routine procedure on raw materials coming to Crane. There's no unloading of the more than 3,000 incoming carloads per year until the Crane Quality Control Lab gives an unqualified O.K.

The extra care that Crane gives to raw materials, and similarly to every step in manufacturing, pays off in better valves for you. You can be sure that Crane stands for quality that results in lower cost in the long run.

That's another reason why thrifty buyers prefer Crane valves. They know they're investing in better piping performance as well as protecting against untimely and excessive maintenance. A mighty important consideration in these days of high costs. And, surely, the main reason why industry keeps using more Crane valves than any other make.

**Better Quality**
**Bigger Selection**
**in Valves**
**for Every Need**





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**CRANE'S FIRST CENTURY . . . 1855-1955**

**How hospitals can save money** and obtain better heat by burning coal is the theme of a new selling aid recently published by the Market Promotion Committee, National Coal Association. The booklet is designed as an aid to hospital administrators and their architects and engineers. Titled "Modernized Coal Serves Today's Hospitals," the 49-p publication cites savings gained through coal by 13 typical hospitals across the Nation. Copies may be obtained upon request to National Coal Association, Southern Building, Washington 5, D. C.

## New Books for Coal Men

### Aluminum-Conductor Manual

**Kaiser Aluminum Electrical Conductor Technical Manual.** A practical, comprehensive reference book on aluminum electrical conductor, designed as a basic guide for use in engineering aluminum conductor installations. The new book provides engineering data, information on the application to overhead distribution and a basis for all necessary calculations. *190 pp. Free if requested on company letter head, otherwise $2.00. Technical Editor, Kaiser Aluminum & Chemical Sales, 228 N. La Salle St., Chicago 1, Ill.*

### Other Books and Booklets

**Bibliography of the Fischer-Tropsch Synthesis and Related Processes, Part I, Review and Compilation of the Literature on the Production of Synthetic Liquid Fuels and Chemicals by the Hydrogenation of Carbon Monoxide,** by H. C. Anderson, J. L. Wiley and A. Newell. *Bulletin 544, 8x10¼-in; paper 532 pp. $2.25. Superintendent of Documents, Government Printing Office, Washington 25, D. C.*

## Among Manufacturers

Begins on p 122

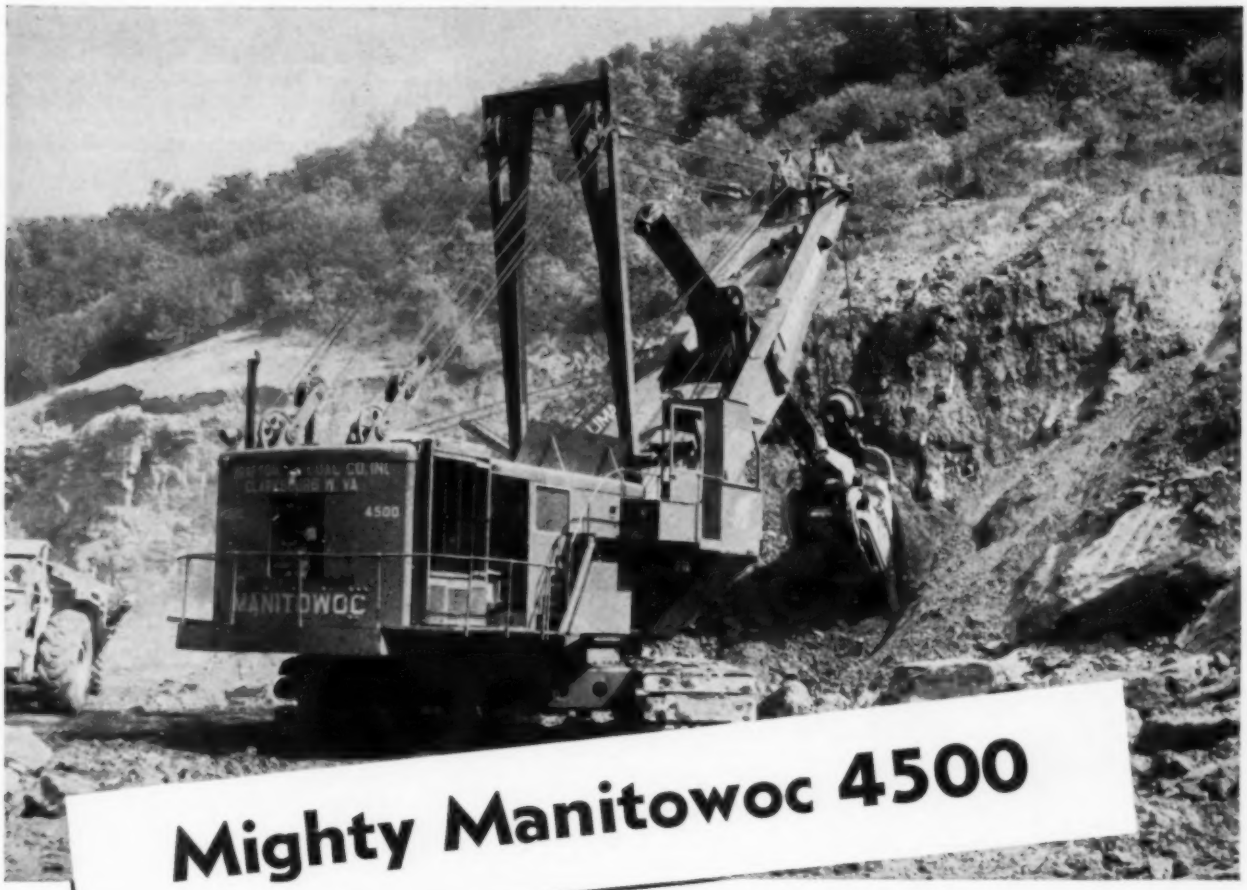
dustrial Products and Lamp Group, succeeding Mr. Paxton.

### Dorr-Oliver Merger

Effective at the close of business Dec. 31, 1954, the Dorr Co., Stamford, Conn., and Oliver United Filters Inc., Oakland, Calif., merged under the name of Dorr-Oliver, Inc., with headquarters at Stamford, Conn.

### Birchard Heads Le Roi

Westinghouse Air Brake Co. has appointed Paul I. Birchard vice president and general manager of the Le Roi Div., Milwaukee, Wis., replacing Edward J. Green, who has been temporary general manager of the division since the resignation of T. O. Liebscher, former president of the Le Roi Co. Mr. Green will return to Westinghouse Air Brake headquarters in Pittsburgh to resume his position as executive assistant to the presi-




# Mighty Manitowoc 4500

## Powerful Producer

*Big Yardage* on every mining operation when there's a Manitowoc 4500 on the job. More profits per shift—less down time—smooth, tireless operation day after day—that's what you look for in a dragline or shovel—and that's what strip miners all over the nation are getting from their Manitowocs.

Here's a 4500 shovel with a 40′ boom, 27′ sticks and 5½ yd. dipper stripping 60′ to 80′ of tough overburden for Grafton Coal Co., Clarksburg, W. Virginia, averaging 3500 yards per 8 hour day. A Manitowoc has the operating features to give you this kind of performance on every job—smooth, positive-action torque, converter, fast operating cycles, special design long-reaching booms, hi-lift shovels, complete diesel operation for traveling anywhere without a trailing cable or electric supply, wide pads and wide crawlers that mean lower ground pressure.

See and get the facts on Manitowoc before you buy your next shovel or dragline.

MANITOWOC
SHOVELS 1-5 YD. Speed Crane CRANES 18-100 TON

dent. For the past 6 yr, Mr. Birchard has been vice president and general manager of the Enterprise Engine & Machine Co., San Francisco, Calif. Le Roi Div. has announced the appointment of Don S. Permar to the newly created post of field sales manager. Mr. Permar, formerly sales manager of stationary air compressors, joined Westinghouse Air Brake as a pneumatic engineer in 1945, and in the fall of 1946 became a special representative for the Industrial Products Div.

### NM&SC Advances Wasson

National Malleable & Steel Castings Co., Cleveland, has elected Stowell C. Wasson vice president in charge of operations, succeeding the late Walton L. Woody. Mr. Wasson has been manager of the company's Chicago and Melrose Park plants since 1943. In his new position, he will have general responsibility for operations at National's plants in Cleveland, Chicago, Indianapolis, Sharon, Pa., Melrose Park, Ill., and Phoenix, Ariz. Mr. Wasson, a director, has been with the company since 1911, in both operations and sales.

### Marlow Pumps Appoints

Marlow Pumps Div., Bell & Gossett Co., Ridgewood, N. J., has named F. R. Paris assistant sales manager. Mr. Paris will directly supervise all Marlow Div. district engineers west of the Mississippi. With the company as a district engineer for the past 5 yr and active in pump engineering and sales work for over 18 yr, he will make the Longview, Texas, plant his official headquarters.

### Linatex Names Sales Manager

The Linatex Corp. of America, Rockville, Conn., has appointed William MacDonald sales manager, with headquarters at the new offices at 70 E. 45th St., New York. Mr. MacDonald, a graduate of Queens University, Canada, has been manager, eastern sales division, Denver Equipment Co., since 1950, and from 1946 to 1950 was associated with Macalder Mines, Ltd., an East African operation.

### New B-E District Sales Mgr.

Robert P. Brooks has been named northwestern sales manager for Bucyrus-Erie Co., S. Milwaukee, Wis., in charge of sales in the states of Washington, Oregon, Idaho and Montana, the Territory of Alaska, British Columbia and Alberta and the Yukon Territory. He will maintain headquarters in the Seattle district sales office. A mining engineering graduate of Pennsylvania State University in 1946, Mr. Brooks joined Bucyrus-Erie under a special apprenticeship, and later was assigned to the Seattle office as a small-shovel sales representative.

### And For Your Information . . .

Central Mine Supply Co., Mt. Vernon, Ill., has been named an authorized mining tool distributor for Carboloy Dept., General Electric Co., Detroit. The organization, which services Illinois, Indiana and eastern Kentucky mines, will handle only cemented-carbide cutter bits, auger

drill and finger bits, roof-bolting and masonry drills.

**Joy Mfg. Co.,** Pittsburgh, has asked its shareholders to increase its debt limit from $10,000,000 to $20,000,000. At the same time it outlined plans for a $2,700,000 improvement program. The stockholders will vote on the debt limit request at the annual meeting on Jan. 13. The increase is necessary, directors said, because the company has developed extensively since the old limit was fixed in 1949. The improvement program calls for additions at plants in Franklin, Pa., and Michigan City, Ind.

**The Pennsylvania Crusher Co.,** a wholly-owned subsidiary of Bath Iron Works Corp. since 1947, merged with the parent company on Dec. 31, 1954, and will be operated as the Pennsylvania Crusher Div. of Bath Iron Works Corp. There will be no change in operations.

**Construction Machinery Div., Clark Equipment Co.,** Benton Harbor, Mich., has appointed J. J. Turner, Inc., Cleveland, to handle the Michigan line of excavator cranes and tractors in eastern Ohio.

**Announced jointly by John T. Ryan,** president, Mine Safety Appliances Co., Pittsburgh, and Henry G. Riter, 3rd, president, Thomas A. Edison, Inc., W. Orange, N. J., was the purchase by Mine Safety Appliances Co., Ltd., Glasgow, Scotland, a wholly-owned subsidiary of the Pittsburgh company, from Thomas A. Edison, Ltd., London, an Edison subsidiary, of machinery and equipment for the manufacture of Edison electric safety mine lamps in Glasgow. Under a licensing agreement between the parent companies, Mine Safety Appliance Co., Ltd., heretofore distributor of the Edison Mine Lamp in world markets other than the western hemisphere, will now also produce the Edison lamp for these markets.

**Firth Sterling, Inc.,** Pittsburgh, has named additional distributors in a move to further expand its distribution facilities including: Losey & Co., Easton, Pa., for eastern Pennsylvania trading area; and E. C. Blackstone Co., Memphis, for Memphis, northern Mississippi and Arkansas trading areas.

**General Motors, Detroit Diesel Engine Div.,** has named Reid-Holcomb Co., Inc., Indianapolis, Ind., as distributors for GM diesel engines. With complete factory-approved sales and service facilities in Indianapolis, and sales engineers located in principal Indiana cities, the company is in a position to serve GM diesel owners throughout most of the state.

**The election of Donald F. Morris** as treasurer of the Goodman Mfg. Co., Chicago, has been announced by W. E. Goodman, president. Mr. Morris, a CPA and a graduate of the Harvard School of Business and the University of Chicago, will continue as controller in addition to his new duties as treasurer.

**Standard Pressed Steel Co.,** Jenkintown, Pa., has promoted Theodore H. Bourguignon, a veteran of 13 yr in all

company departments, to the company's outside sales staff, with headquarters in Indianapolis, covering southern Indiana, southwestern Ohio and all of Kentucky. In 1950, Mr. Bourguignon was promoted to the inside sales staff at the Hallowell Div., and was made assistant manager about a year ago.

**Otis Elevator Co.** recently announced the acquisition of Baker-Raulang Co., Cleveland, and its subsidiary Baker-Lull Corp., Minneapolis. The new acquisitions will be operated by Otis as a Delaware corporation and continue under the name of Baker-Raulang Co. L. A. Petersen, president of Otis, is chairman of the board and chief executive officer of the subsidiary, and William Bauer, formerly president of Baker-Raulang, is president.

**McKiernan-Terry Corp.**, Harrison, N. J., has appointed Herbert G. Dillon sales manager of its Mead-Morrison Div., in charge of the company's sales of coal and ore unloaders and bridges, and other material-handling equipment. Mr. Dillon was most recently engaged in similar work at Heyl & Patterson, where he had been vice president in charge of sales since 1950 and previously sales manager for 5 yr.

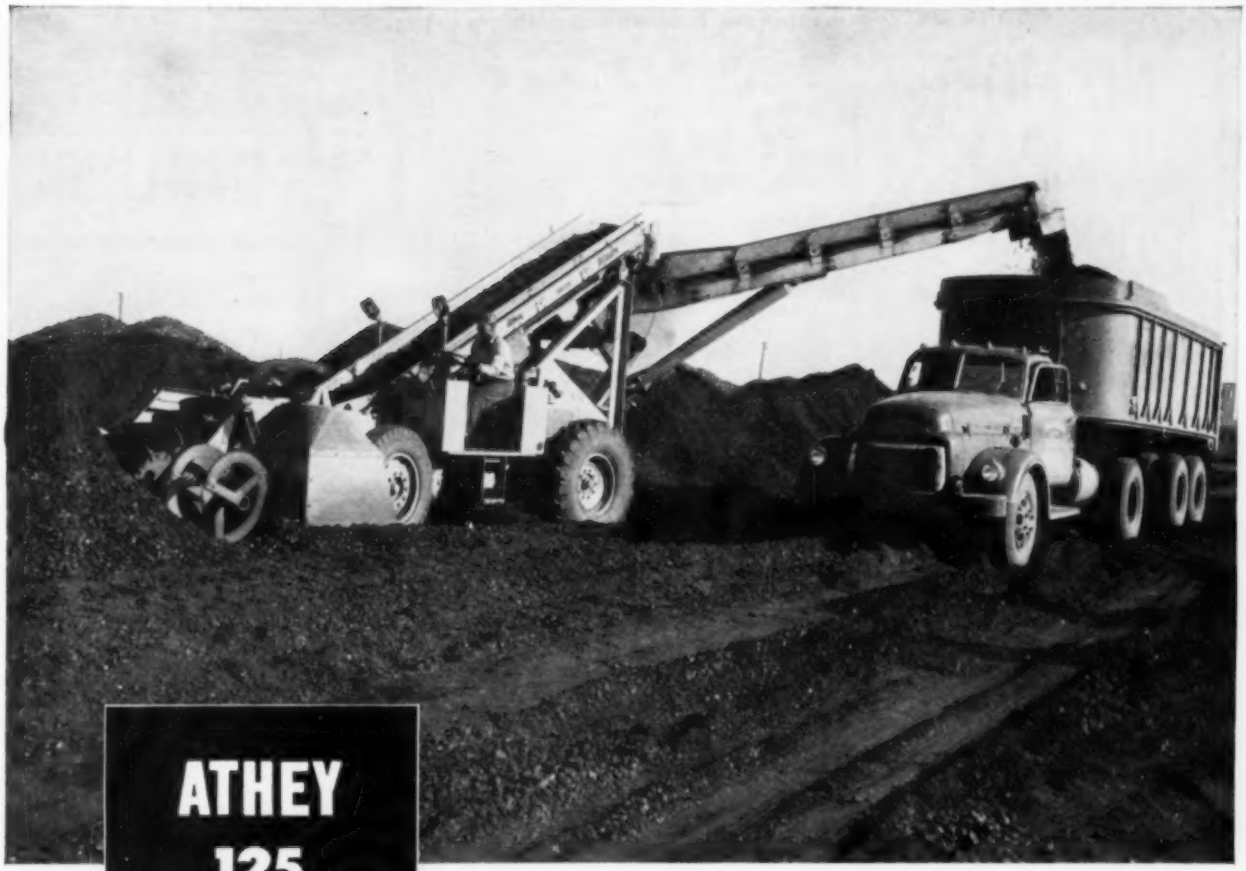
**Vickers, Inc.**, Detroit, Mich., has reopened a district sales office in St. Louis, Mo., providing added application-engineering and service assistance to users of oil-hydraulics in the growing Midwest market. District sales manager of the new office is Robert H. Mezger who, for the last 5 yr, has been associated with the Chicago district sales office.

**Norton Co.**, Worcester, Mass., will add to its electric furnace capacity by building a new plant in Huntsville, Ala. This expansion of electric furnace facilities, located since 1910 in Chippawa, Ont., will be on a 100-acre site, and completion is expected by the end of 1955. Total cost of land, buildings and equipment is estimated to be $1,250,000.

**Harnischfeger Corp.** has announced the following changes in its two shovel divisions. The former P&H Small Excavator Div. is now the P&H Power Crane & Shovel Div., handling the sales of all P&H crawler machines from the ½-yd Model 153 through the 3½-yd Model 1055, and all P&H truck cranes from the 7-ton capacity Model 55 through the 35-ton capacity Model 555 TC. The P&H Electric Shovel Div. is now the official designation for this company's division in charge of all electric machine sales, including the Model 1055 shovel through the 10-cu yd Model 1855 dragline. There are no personnel changes in the divisions.

**Hercules Motors Corp.**, Canton, Ohio, has opened a new factory branch at 400 S. Edgewood Ave., Jacksonville, Fla. serving as a parts warehouse for Florida, Alabama, Georgia and South Carolina. Facilities of the new factory branch include a complete parts department and fully equipped repair shop. John C. Poulton is branch manager.

**The Robertson-Heil Co.**, Meridian,



# ATHEY 125 HILOADER

## *LOADS TEN 18-TON TRUCKS EACH HOUR at Seminole Coal Corporation*

Every six minutes an 18-ton truck pulls away from the conveyor of the Athey 125 HiLoader. Without a halt in production, the HiLoader swings its conveyor to another truck already in position. The HiLoader's full-floating feeder bites into the stockpiled, processed coal, picking up and loading at a rate of more than 200 tons each hour. The fast-moving HiLoader travels from pile to pile to fill needs for different grades of coal. Self-cleaning feeder and moldboard eliminate the need for hand cleaning and there is no mixing of grades of material when moving from pile to pile.

The versatile HiLoader replaces a ¾ yd. shovel, and in the words of Superintendent W. H. Price of Seminole's Lenzburg, Illinois plant, "We are well pleased with the performance, operating ease and loading speed of our HiLoader."

*Your* loading can be put on a mass-production basis with an Athey HiLoader. Ask your Athey-Caterpillar Dealer to show you the many features of the 125 HiLoader . . . there's no obligation!

• • •

The self-propelled HiLoader can load windrowed or stockpiled materials at the rate of 10 cu. yds. a minute . . . snow, 25 cu. yds. a minute. Travel speeds range up to 20 MPH. The conveyor swings 45° to either side of center to eliminate time lost in truck-spotting.

**ATHEY PRODUCTS CORPORATION**

**5631 West 65th Street • Chicago 38, Illinois**

Athey

Miss., now is manufacturing Heil steel dump bodies, according to a recent statement by W. A. Carlson, sales manager of the Body and Hoist Div. of the Heil Co., Milwaukee, Wis. They will be sold through Heil distributors in Texas, Louisiana, Tennessee, Mississippi, Alabama, Georgia, and Florida.

**Foxboro Co.**, Foxboro, Mass., Nov. 1 officially opened a new instrument service and assembly building in San Leandro, Calif., which more than doubles the company's West Coast manufacturing facilities. The building is fully equipped for all types of instrument work ranging from parts replacements, complete repairs and adjustments to new instrument assembly.

**Fuller Mfg. Co.**, Kalamazoo, Mich., has opened its new Southwest district office at 204 S. Cheyenne St., Tulsa, Okla., under the management of Howard J. Passage, who will function in the area as sales and service counsel for all Fuller products. Prior to his new assignment, he was associated with the company's Transmission Div. at Kalamazoo.

**Fielden Instrument Div., Robertshaw-Fulton Controls Co.**, has announced the expansion of its plant and office facilities in Philadelphia to three times the former area. The company also announced that a new engineering and technical service office has been established in St. Louis to serve the central states. In charge of the new office, located at 2901-21 Clark Ave., is Robert E. Edsall, formerly assigned to Fielden headquarters in Philadelphia. Fillo Sales & Engineering Co. has been appointed manufacturer's representative in St. Louis.

**The Riverside Metal Co.**, Riverside, N. J., has been purchased by H. K. Porter Co., Inc., it was announced Nov. 23 by T. M. Evans, Porter president. A 100-yr-old concern, Riverside manufactures non-ferrous metals in sheet, strip, rod, wire, bar and circle. It is the fourth manufacturing firm acquired by Porter during 1954.

**E. I. du Pont de Nemours & Co., Inc.**, Wilmington, Del., has announced plans for construction of another laboratory building at du Pont's experimental station, the third to be started within the last 6 mo. The new $1,815,000 structure for long-range and fundamental research will be shared by du Pont's Explosives and Organic Chemicals departments. Upon completion of the laboratory in early 1956, all 10 of du Pont's manufacturing departments will have research facilities at the experimental station.

**Federal Motor Truck Co.**, is again in operation, according to an announcement by M. J. McCarty, executive vice president. Already shipping service parts to its 300 dealers throughout the world, the newly-reorganized firm is now developing and testing pilot models for a complete line of units in the heavy-duty class and will resume manufacturing at a plant in Detroit.


# All business is specialized

*. . . and nothing specializes on <u>your</u> business like your business paper*

Here's a smart business man. He spends his time where every sitzmark parks a prospect at his feet. It's simple sense: He *specializes* . . . and it *pays*!

Your business is specialized, too . . . and so is your business paper. The time you spend with it pays . . . for its editors are experts in your specialty. They scout the field . . . report what's good that's new . . . find ideas that worked . . . suggest methods to keep you a leap ahead of competition.

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That's help you can't find concentrated into such quick reading time *anywhere* else! It's help that puts many a man out front in his field, as a specialist who knows what's what today . . . sees what's coming tomorrow. It's simple sense to read every page, every issue.

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This business paper in your hand has a plus for you, because it's a member of the Associated Business Publications. It's a paid circulation paper that must earn its readership by its quality . . . And it's one of a leadership group of business papers that work together to add new values, new usefulness, new ways to make the time you give to your business paper still more profitable time.


**A copy of this quick-reading, 8-page booklet is yours for the asking. It contains many facts on the benefits derived from your business paper and tips on how to read more profitably. Write for the "WHY and HOW booklet." Room 2710.**

**McGRAW-HILL PUBLISHING COMPANY**
330 West 42nd St., New York 36, N. Y.

One of a series of advertisements prepared by THE ASSOCIATED BUSINESS PUBLICATIONS



**SEARCHLIGHT SECTION**

# CLASSIFIED SEARCHLIGHT SECTION ADVERTISING

## EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

**UNDISPLAYED RATE:**
$1.20 a line, minimum 3 lines. To figure advance payment count 5 average words as a line.
POSITION WANTED undisplayed advertising rate is one-half of the above rate, payable in advance.
PROPOSALS, $1.20 a line an insertion.

**INFORMATION:**
BOX NUMBERS care of publication count as 1 line additional.
DISCOUNT OF 10% if full payment is made in advance of four consecutive insertions of undisplayed ads (not including proposals).
EQUIPMENT WANTED OR FOR SALE Advertisements acceptable only in Displayed Style.

**DISPLAYED RATE:**
The advertising rate is $10.20 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request. AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. C.A.

*NEW ADVERTISEMENTS: Address N.Y. office, 330 W. 42 St., N.Y. 36, for February issue. Closing January 17th.*

*REPLIES (Box No.): Address to office nearest you*
*NEW YORK: 330 W. 42nd St. (36)*
*CHICAGO: 520 N. Michigan Ave. (11)*
*SAN FRANCISCO: 68 Post St. (4)*

### POSITION WANTED

WANTED POSITION as Mine-Foreman, or assistant. Age 47. Thirty years experience in large mechanical mines. Last 15 years as Assistant foreman. Have first grade mine foreman certificate. Can furnish good recommendations. PW-4960, Coa Age.

### BUSINESS OPPORTUNITY

Strip Coal Wanted

Lease or purchase—large or small tracts. Morgan Coal Company, 2850 North Meridian Street, Indianapolis 8, Indiana.

**FOR SALE**
Western Coal Co. Mine. 10' vein of coal. Mine is in operation. Priced at $18,000. This includes all equipment and 320 acres of land. Other interests reason for selling. Contact John W. Sekulich,
**Western Coal Co., Roundup, Montana**

**SCOTCH PINE (RIGA)**
*3 year seedlings.*
For spoil bank and reforestation plantings. Have large supply. Low price on 100,000 or more orders. Write:
**SUNCREST EVERGREEN NURSERIES**
Box 305, Homer City, Pa.

**WANTED**
**ELEC COAL DRILL**
for 6 in. Diameter holes & 6 ft length
**CARTHAGE COAL MINES**
P. O. Box 234
Socorro, New Mexico

WANTED: (2) 2½ yd. Shovels, Northwest 80D or equiv. (3) Tractors, Cat D8 (or equiv.) with 8S dozer blade, #25 power con., rock bucket. (2) Wagon Drills, (2) Rock Drills (heavy duty). Plate Bending Rolls (20' to 40' lg.). 50-Ton Port. Rivet Squeezers. All types Air Tools, Magnaflux Machines. Also: Hose, Line Oilers, Bits, Steels, Pavement Breakers, Clay Spades, Rotary Tools, Tampers, Vibrators, Grinders, etc. Please furnish photos and best prices for resale. MONTGOMERY ENG'G. CO., 1708 W. Phila., Detroit 6, Mich. Tel: TRinity 4-0929

**FOR SALE**
**4500 MANITOWOC DRAGLINE**
National Business Exchange
150 Broadway, New York 38
Cortlandt 7-2912

**RAILROAD TRACK SCALE**
125 ton Fairbanks Morse, type F, style 41, 50 ft. platform. Further information upon request.
**Philadelphia Transformer Co.**
2829 Cedar St. Phila. 34, Pa.

**FOR SALE**
**MINE EQUIPMENT**

LOCOMOTIVES—6-15 tons, 42" track gauge, 250 volts D. C.—Goodman, General Electric, Jeffrey, and Westinghouse.
MINING MACHINES—Shortwall (no trucks), 6' cutter bar, 250 volts D. C. permissible—Jeffrey, 35-B, Goodman Universal and Standard.
ELECTRIC MOTORS—5 to 25 H. P., D. C., 30 to 50 H. P., 440 volts, 3 phase, 60 cycle. One 300 H. P., A. C., 2200 volts, 3 phase, 60 cycle, 585 RPM.
PUMPS—5" x 6" Deming, 4" x 6" Scranton.
COAL DRILLS—Jeffrey A-7, 250 volts permissible.
SHAFT HOIST—Vulcan, cylindro-conical drum 7' to 9', grooved for 1⅜" rope, 500 H. P., 2300 volt, A. C. motor—Shaft 225' deep. Two Vulcan, 1 Lidgerwood hoists: 75 H. P. motor, drum coils 2200 ft. of ⅞" rope.
BRADFORD BREAKER—Pennsylvania Crusher Co. 12' x 19', complete with chutes and housing.
LOADING BOOMS—60" apron type.
VIBRATING SCREENS—Jeffrey, Traylor FB-2, FB-4.
Brown-Fayro Oil Spray System, 5 H. P., 440 volt motor, 400# pressure.

Large Stock of Mine Supplies
Locomotive, Mining-Machine, Pump Parts.
**J. H. HILLMAN & SONS COMPANY**
JEROME MINE
JEROME, SOMERSET COUNTY, PA.
OR
**J. H. Hillman & Sons Company**
1914 Grant Building, Pittsburgh 19, Pa.

**DIESEL ENGINES • GENERATOR SETS**
All Sizes—10 KW to 2000 KW—AC and DC
ALL UNITS FULLY GUARANTEED
*"We Own What We Offer"*
AG SCHOONMAKER CO., INC.
50 CHURCH ST. NEW YORK 7, N. Y.
Plants: SAUSALITO (S.F.) CALIF., JERSEY CITY, N. J.

George W. Used Machinery
**EGAN—EXPORTER**
*"The Machinery Man Known Everywhere"*
MINE MACHINERY — INDUSTRIAL
RAILROAD EQUIPMENT
239 Main • Woonsocket, R. I. • Tel. 3258

**BONDED EQUIPMENT BARGAINS FOR COAL INDUSTRY**
IMMEDIATE SHIPMENT FROM STOCK

**NEW CONVEYOR BELTING**
**Save 28%**
Heavy duty 4-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom cover rubber belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stock.

| Width | List Price | Sales Price |
|---|---|---|
| 16" | $3.64/ft. | $2.62/ft. |
| 18" | 4.03/ft. | 2.90/ft. |
| 24" | 5.23/ft. | 3.76/ft. |
| 30" | 6.39/ft. | 4.60/ft. |

Additional widths and piles available at low prices. Write for free sample.

**NEW IDLERS & RETURN ROLLS**
**25% Below List Price**

| | | | |
|---|---|---|---|
| **3-roll, 5" diameter Troughing Idlers for** | | | |
| 16" belt | $17.25 | 30" belt | $19.50 |
| 18" belt | 18.00 | 36" belt | 20.25 |
| 24" belt | 18.75 | 48" belt | 21.75 |
| **1-roll, 5" diameter Return Idlers for** | | | |
| 16" belt | $6.75 | 30" belt | $ 8.25 |
| 18" belt | 7.13 | 36" belt | 8.75 |
| 24" belt | 7.50 | 48" belt | 10.25 |

All steel. Interchangeable with other well-known makes. Replaceable ball bearings. Either sealed type (pre-lubricated) or with alemite fittings. Rust proof ball races. Maintenance is negligible.

**NEW CRUSHERS**
Double and single roll models. Types to produce ¾" stoker and others to crush up to 8" resultant. Capacities from 15 to 500 tons per hour. Steel hoppers included.
Priced from ..... $479.00

**NEW VIBRATING SCREENS**
For sizing and separation of Coal and many other uses. Shaft is mounted on self-aligning bearings and made in heavy duty eccentric shaft types; 1 to 5 decks, 3'x8' to 5'x14'. Others from 2'x4'. Wire cloth or plate included in price.
Priced from ..... $395.00

**NEW MOTOR TRUCK SCALES**
For stationary and portable applications. Scales have steel lever system complete with structural steel weighbridge. Capacities to 50 tons. Recording beams available.

| | |
|---|---|
| 26 Ton Truck Scales (Pit Type) | $ 782.00 |
| 30 Ton Truck Scales (Portable) | 1530.00 |

*WRITE FOR CATALOG AND PRICES*
**BONDED SCALE AND MACHINE CO.**
2190 S. THIRD ST. COLUMBUS 7, OHIO
PHONES: Hickory 4-2186; FR 6-8898, Evenings

# —TRANSFORMERS—
## BOUGHT AND SOLD

We carry a large stock of rebuilt and guaranteed transformers, and invite your inquiries.
Custom-built transformers and coils manufactured to your specifications.
*Expert Repair Service*—all makes and sizes of transformers rewound, repaired and redesigned. Ask for our price schedule.

**THE ELECTRIC SERVICE CO., INC.**
5331 Hetzel St. Cincinnati 27, Ohio
*40 Years' Dependable Service*

### CAT TRUCKS

1—Goodman Type RHT-2 Cat Truck, 250 volts DC, like new.
1—Joy T-2 Cat Truck, 250 volts DC.
2—Joy T-1 Cat Trucks, 250 volts DC.
1—Goodman MAT Cat Truck, 250 volts DC.

### CONVEYORS

1—30" Joy belt conveyor, 850' centers. Unit used less than six months, absolutely perfect condition.

### COPPER

Several thousand feet of 1,000,000 CM weatherproof in lengths 500' to 500' wrapped on reels.
Approximately 30,000' 1,000,000 CM Bare, wrapped on reels, lengths 500' to 1000'. Just as good as new.
Approximately 5,000' 500,000 CM bare, wrapped on reels, lengths 500' to 1000'. Like new.
Several thousand feet 6/0 Fig. 8 Trolley wire, long lengths.
Several thousand feet 4/0 Fig. 8 Trolley wire, wrapped on reels and coils. Like new.
Several thousand feet 2/0, 3/cond. armored steel, lead covered, 2300 volts to 5000 volts.
Several thousand feet 2/0 to 3/cond. Trenchlay, 2300 volts, like new, in lengths 500' to 1000'.
Several lengths from 300' to 400' each 4/0, 3/conductor, rubber covered, armored drill hole cable. Perfect condition.

### CRUSHERS

2—36 x 36 Jeffrey Single Roll in perfect condition.
1—24 x 48 McNally-Pittsburgh Double Roll.
1—24 x 24 Jeffrey Single Roll.
1—24 x 24 McNally-Pittsburgh Single Roll.
1—24 x 24 Webster Single Roll in perfect condition.
1—24 x 29 Jeffrey Flextooth.

### FANS

1—30" Jeffrey 8H-30 Aerolyne Fan, like new.
3—5' Jeffrey Aerolyne fans, new in 1948.

### DRILLS

2—#588 Chicago Pneumatic DC Drills with TDA650 arms, mounted on Cat Truck. In perfect condition.

### LOADING MACHINES

5—11BU Joy Loaders, type 10APE, 250 volts, DC Permissible.
2—8BU Joy Loaders, 220 volts, AC.
2—8BU Joy Loaders, 250 volts, DC.

### LOCOMOTIVES

8—15-ton Jeffrey, type MH77, ball bearing motors, air brakes, 42" gauge, new in 1946, new type resistance, locomotives are as good as new. Overall dimensions: length 14'7", width 5'2", height from rail 40", outside armor steel frame 3½", Can be made 36" gauge.
5—15 ton Goodman, type 36-A-04C, 42" gauge, ball bearing motors, overall dimensions: length 14'7", width 5'2", height from rail 40", outside armor steel frame.
2—15 ton Jeffrey, type Mil 74, ball bearing motors, 42" gauge, outside armor steel frame, overall dimensions: length 14'7", width 5'2", height from rail 40".
1—10 ton Jeffrey, type MH 143, ball bearing motors, ball bearing journals, 42" gauge, late type.
50—6 ton Jeffrey MH 88, ball bearing motors, complete with gathering reels and new type steel resistance, 42" gauge, overall dimensions: length 13' width 48", height from rail 39". Locomotives in perfect condition, ready to go to work without spending a cent on them.
25—6½ ton Mancha battery locomotive, complete with practically new Gould and Exide batteries. 48 cells with 27 and 29 plates. Batteries have been fully charged, and some used less than 6 months. Overall dimensions: length 12', width 60", height from rail 42", height of battery box only 29". We can make a special price for either the complete locomotive with the batteries, or the batteries alone.

Also many 5 to 12 ton Jeffrey and Goodman locomotives in gauges from 36" to 48".

### MINING MACHINES

4—512 EJH Goodman, 250 volts, DC, 8½' cutter bars with hydraulic jacks and bug dusters, complete with Joy T1 Cat Trucks. Permissible.
3—512DJ3A Goodman, 220/440 volts, AC, 8½' cutter bars, with Joy T1 Cat Trucks.
6—7B-1 Sullivan, 250 volts, DC, 8½' cutter bars, complete with bug dusters, permissible, with Joy T1 Cat Trucks, permissible.

### MOTOR GENERATOR SETS

1—300 KW Ridgeway, 2200 volts, 250 or 275 volts, DC, 1200 RPM, complete with switchboard.
2—200 KW General Electric, 2300 volts, AC, 275 volts, DC, 1200 RPM, complete with fully automatic switchboard.
1—200 KW Westinghouse, 2200 volts, AC, 275 volts, DC, 900 RPM with automatic circuit breaker for DC and manual starter for AC.
5—150 KW Westinghouse, 2200 volts, AC, 275 volts, DC, 1200 RPM, complete with fully automatic switchboard.
1—150 KW General Electric, 2300 volts, AC, 275 volts, DC, 1200 RPM, complete with fully automatic switchboard.

### MISCELLANEOUS

150—7 ton ACF all steel drop bottom mine cars, 14' long, 7' wide, 48" high, 48" gauge, 16" wheel, like new.
12—42D Joy battery shuttle cars, excellent condition, cheap.
2—MSA rock dusters, type S' track mounted, 42" Ga.
5—4' x 10' Selectro single and three deck vibrators.
2—5' x 14' Robbins Gyrex two deck vibrators.

## GAVENDA BROTHERS, Inc., Canton, Ill.

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*NEW and REBUILT STORAGE BATTERY*

## LOCOMOTIVES

**1½ to 10 Tons 18" to 56½" Track Gauge.**
**GREENSBURG MACHINE CO.**
**Greensburg, Pa.**

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## Ironton Electric Locomotives

**New and used**
**The Ironton Engine Company**
**Farmingdale, New Jersey**

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## OFFERING AT UNHEARD OF LOW PRICES

10—5-5C7AE and 7CXE Shuttle Cars, matched pairs, elevated discharge, all hydraulic
2—6-5C5E Shuttle Cars
10—42-E Shuttle Cars, all hydraulic
12—14BU-3PE Joy Loading Machines, 7½ and 10 HP motors. Excellent condition
All types of Cutting Machines—track, cat, and rubber tired.
5—G.E. 200 KW latest type M.G. Sets, 1200 RPM, 275 V DC, 2300/4000 V AC, with 1600 amp. I-T-E automatic reclosing circuit breakers, full automatic switchgear.
2—G.E. 150 KW M.G. Sets, 1200 RPM, 250/275 V DC, 2300 V AC. Complete units.
3—G.E. 200 KW Rotary Converters, type HCC-6, Form P, 1200, 250/275 V DC, 2300/4000 V transformers. Complete units.
300—Practically new Sanford-Day 42" gauge Rotary Dump Mine Cars, all steel.
200—Practically new 6-ton Sanford-Day Drop Bottom Mine Cars, 48" gauge. Almost new.

**BARGAIN IN LATE TYPE REBUILT LOCOMOTIVES:**

1—20-ton G.E. Tandem Locomotive, equipped with GHM-843B1, 250 V DC, ballbearing motors, consisting of two (2) 10-ton Locomotives, Ser. Nos. 29490-29491, contactor controls, air brakes, air sanders, Timken roller bearing journal boxes, equalizing springs, one piece axle caps, 32" high, speed 8.5 MPH. New in 1952.
5—15-ton Jeffrey MH-110 Locomotives, Ser. Nos. 6619-7153-7257-7305-7306
2—15-ton Jeffrey MH-77 Locomotives, Ser. Nos. 7304-7790
1—20-ton Jeffrey MH-77 Locomotive, Ser. No. 7615.

The above are 42" gauge but can be changed to 44" or 48". All are completely rebuilt and guaranteed. Complete specifications and our low prices on request.

**Several late type 4-, 5-, and 6-track Steel Tipples, Link-Belt and McNally-Pittsburg 5-cell Coal Washers, and two Link-Belt Multi-Louvre Dryers, single and double drum Hoists for shaft, slope, and drift mines, with 300 to 1200 HP motors.**

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**Track Accessories**

**LEFTON INDUSTRIAL CORP.**
*General Office:* 212 Victor Street
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***NEW · REBUILT***
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COAL OPERATION CONSULTANTS
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*Designing Engineers — Consultants — Builders*
MODERN COAL PREPARATION PLANTS THRU
"CO-OPERATIVE ENGINEERING"
906-08 Sycamore Bldg. — Terre Haute, Indiana

**J. PIERRE VOGEL**
COAL INVESTIGATION — COAL PREPARATION
COAL STRIPPING
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PITTSBURGH 22, PENNSYLVANIA

**PAUL WEIR COMPANY**
MINING ENGINEERS and GEOLOGISTS
CONSULTANTS and MANAGERS
DESIGN and CONSTRUCTION
20 North Wacker Drive — Chicago 6, Illinois

**J. W. WOOMER & ASSOCIATES**
*Consulting Mining Engineers*
Modern Mines Systems and Designs
Foreign and Domestic Mining Reports
National Bank Building — Wheeling, W. Va.
Henry W. Oliver Bldg. — Pittsburgh, Penna.

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- TRIGGERS ACTION.

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**MORE INFORMATION on any product advertised in COAL AGE may be easily secured by using the postage-free card facing p. 109**





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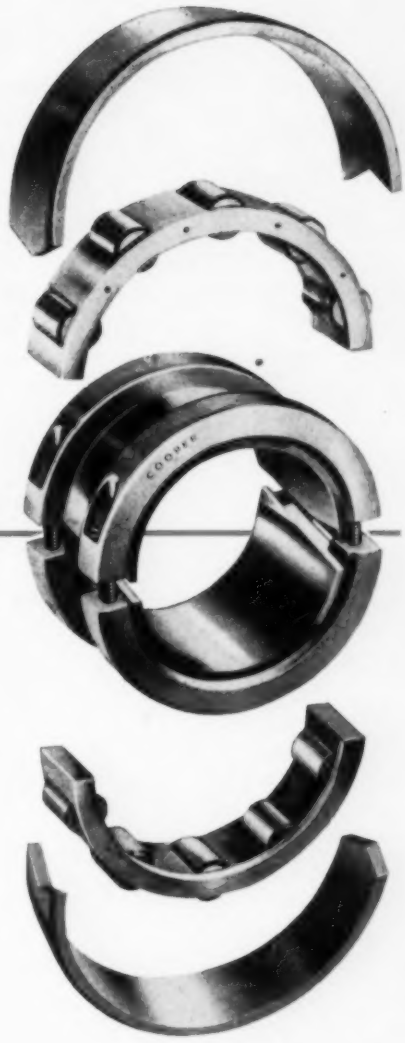
## from Bearings, Inc.

### A Bearing Design that Offers NEW, Important SAVINGS in Bearing Mounting Costs!

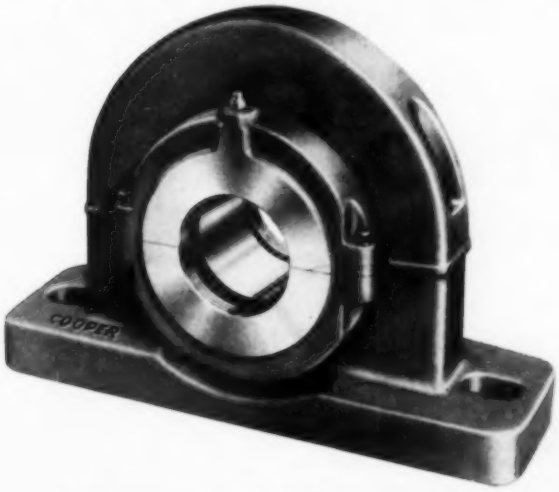


**SPLIT RIGHT DOWN TO THE SHAFT**

## COOPER SPLIT ROLLER BEARINGS

Cooper Split Roller Bearings are regular roller bearings with the added, money-saving feature of being split down to the shaft. This split design enables the user to apply an anti-friction bearing where it would be impractical or impossible to mount a solid ball or roller bearing without tearing down the whole machine. The savings in actual labor cost on mounting are considerable. Cooper Bearings are also used in place of solid bearings because of their ease of removal for inspection and quick replacement.

Bearings, Inc. is now the authorized distributor for Cooper Bearings. Write now for full information!




*Wide range of dimensions and load capacities are available to suit most applications. Special designs for unusual applications are also available.*

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**BEARINGS, INC., 1516 Kanawha Blvd., West Charleston 2, West Virginia**

Gentlemen:

Please let me have complete information on Cooper Split Roller Bearings as advertised in COAL AGE.

Name_____

Firm_____

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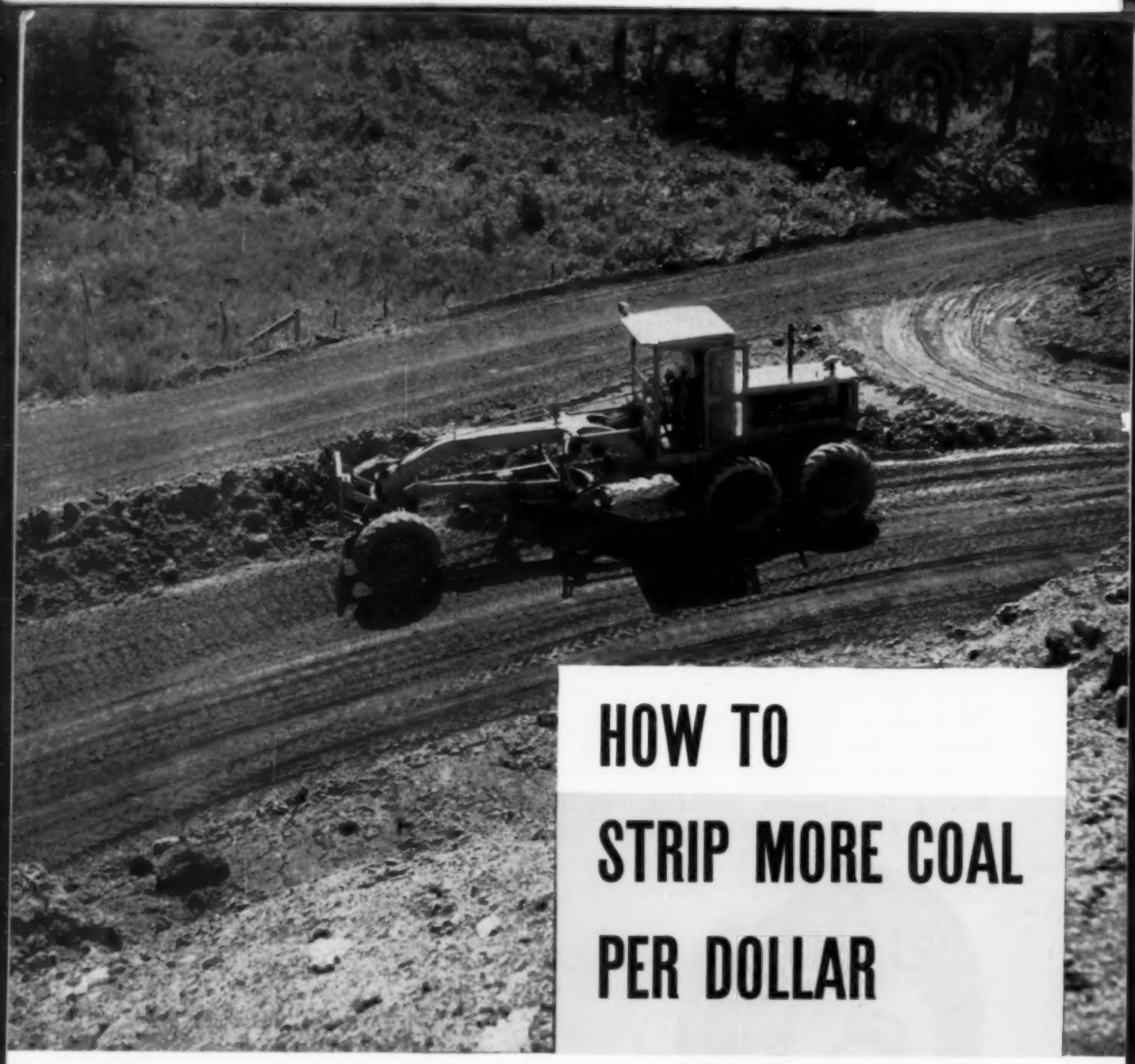
City_____ Zone____ State_____



# HOW TO STRIP MORE COAL PER DOLLAR

A veteran of nearly 10,000 hours, this Caterpillar No. 12 Motor Grader never runs out of money-saving jobs at Evans Coal Co.'s strip mine near Bokoshe, Oklahoma. It builds and maintains haul roads for faster cycle times and to reduce wear-and-tear on equipment. In addition, it works ahead of shovels and 'dozers, clearing off the top of a 24-ft. vein.

Owners like Caterpillar Motor Graders for their fast, high-profit production, their ability to deliver full and *foul-free* power on low-cost No. 2 furnace oil, their traditional ruggedness and good resale value. Operators like CAT* Graders for their excellent visibility, positive non-creep controls, quick-change blade positioning, and other features that make work fast and easy.

All Caterpillar Motor Graders are built—not just assembled—by a single manufacturer. Engine, working speed and blade capacity are matched for sure-footed traction and high output. You can obtain skilled service and genuine factory parts for a Cat Motor Grader from *a single dependable source:* your Caterpillar Dealer.

The new No. 12 Motor Grader has 115 HP and in-cab starting—at no increase in price! Your Caterpillar Dealer will gladly furnish full details. He's as near as your telephone.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

**CATERPILLAR***

*Both Cat and Caterpillar are registered trademarks—®

**99% OF ALL CAT MOTOR GRADERS ARE STILL IN USE**

# U.S. Rubber belting "takes its lumps" and likes it!

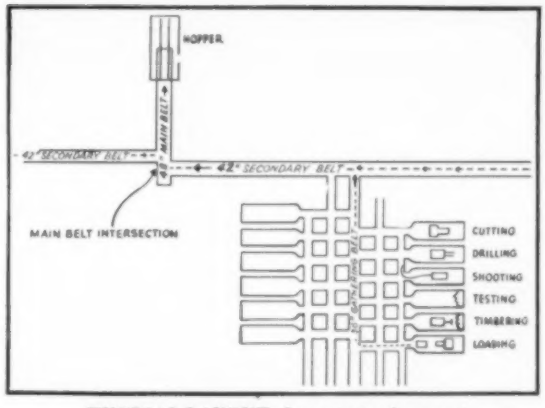
**SECTION OF U.S. GIANT®** Underground coal belt serving as main haulage belt (below). Coal being loaded from 36" U.S. Giant gathering belt onto 42" U.S. Giant secondary haulage belt.

**SCENE:**—Mine No. 10 of the Peabody Coal Co., Illinois. Daily capacity, 12,000 tons. For haulage, belting is used exclusively.

**PROBLEM:** The use of compressed air to break down the coal invariably results in a high percentage of large lumps. The average belt can't take such a beating for long. What to do?

**SOLUTION:** United States Rubber Company engineers were called in to help in the pioneering and design of the world's most modern underground coal handling system. Using the famous "U.S." Three-way Engineering (in which "U.S." engineers work with the mine operators *and* the designers of the conveyor system) gathering belts, secondary haulage belts, transfer belt and main haulage belt—all made by "U.S."—were installed. These belts stand up easily under the constant battering of the large lumps. Troughability and proper training completely eliminate spillage even at peak loadings as high as 2400 tons per hour.

Take *any* conveyor belt problem—large or small—to "U.S." There are sales engineers at your service at any of our 27 District Sales Offices. Or write address below.




**TYPICAL LAYOUT** of a room territory and belt system that serves it.

*"U.S." Research perfects it • "U.S." Production builds it*
*U.S. Industry depends on it*

US RUBBER

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# bring your coal preparation problems to LINK-BELT

FOR whatever you need to produce a uniform, more marketable coal at lower per-ton cost, leave the job in Link-Belt's hands. That's sound practice whether you're building a new coal preparation plant or improving an existing one . . . need a single standard component or entire "turn-key" service.

The Link-Belt quality equipment line is complete. For example, you can choose from three types of washers, and three types of dryers . . . plus crushers, screens, car dumpers and shakers. In addition, Link-Belt makes whatever you need in conveying and power transmission machinery.

Link-Belt services are also complete. When you engage this single source, experts coordinate all phases from testing to satisfactory operation. Their decisions are born of long experience in this field . . . dictated by the character of your particular seam and the requirements of your market.

Call the Link-Belt office near you today, no matter if your needs are large or small. We'll send a coal preparation specialist to make an obligation-free analysis of your requirements.

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